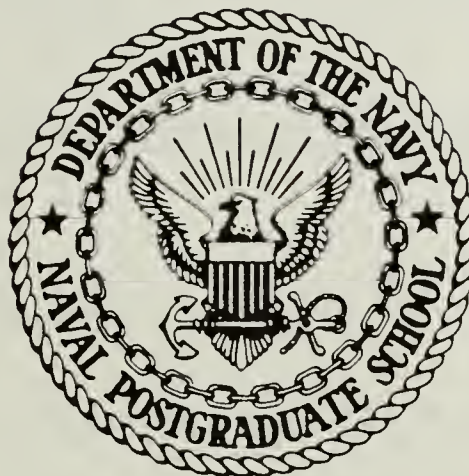


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THESIS

DETERMINATION OF QUANTITATIVE
RELATIONSHIPS BETWEEN SELECTED CRITICAL
HELICOPTER DESIGN PARAMETERS

by

Ronald S. Petricka

September 1984

Thesis Advisor:

D. M. Layton

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quantitatively the values of many of the design parameters heretofore selected by trial and error methods.

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Determination of Quantitative Relationships Between
Selected Critical Helicopter Design Parameters

by

Ronald S. Petricka
Captain, United States Army
B.S., United States Military Academy, 1973

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN AERONAUTICAL ENGINEERING

from the

NAVAL POSTGRADUATE SCHOOL
September 1984

ABSTRACT

This thesis determines the relationships of Helicopter design parameters by first depicting graphically all possible pairings of selected design parameter values and then, secondly, depicting graphically respective curve fits for the data point plots which meet an acceptance criteria. In generating the curve plots, the specific constants of each curve equation are determined, thus allowing the designer the ability to derive quantitatively the values of many of the design parameters heretofore selected by trial and error methods.

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I. INTRODUCTION

The evolution of helicopter design has proceeded far beyond the starting point where design decisions were based on a 'trial and error' criteria. In major helicopter industry, the design process has evolved to a largely technical discipline where, with the noted exceptions of technological breakthroughs which cause a drastic departure from the norm (an example being the Hughes NOTAR, a helicopter without a tail rotor!), a new helicopter design is built by piecing together critical design parameters in a fashion dictated by past successful designs. Those critical design parameters, logically, are determined by the intended user's requirements (e.g., carrying capacity, and mission (scout vs. utility vs. attack)), performance requirements (e.g., speed, climb, and range), and the geometric requirements (e.g., length, and width).

Definite relationships between these critical design parameters (30 have been selected), are frequently unavailable, or unknown, and are not used during the preliminary design process. By examining all possible pairings, or permutations, across a large number of present helicopter designs (10 have been chosen), one could produce equations of curves which would consistently, accurately and quickly produce the quantitative value for the design parameter a designer seeks.

A. OBJECTIVES AND SCOPE

The objective of this thesis is to determine if quantitative relationships exist between the pairings of critical helicopter design parameters. If they do exist, specific

equations of curves, forming a curve fit of the data, and specific constants, are to be determined.

II. APPROACH TO THE PROBLEM

Thirty design parameters were selected and a data base was compiled of the values of these design parameters for 10 helicopters. The 10 helicopters chosen were selected purposely to represent a varied mix of single-mission aircraft (utility, heavy utility, scout or observation, and attack), and old and new technology, ranging from the 1950's to the late 1970's, to lend creditability to the resulting relationships for use in any future preliminary helicopter design process. Selected design parameters, and the respective values for each of the chosen helicopters are listed in Appendix A. A planform and abstract picture of each helicopter, for referencing, is contained in the same Appendix. Table 1 is a brief summary which illustrates the diversity of the helicopters chosen to compile the data base for this thesis.

Pairing each parameter singularly against each other yielded 435 permutations at the start of the evaluation. The pairings are referenced by 2 numbers. For example, the pairing number '1-30' pairs the first design parameter, Main Rotor Blade Radius, against the thirtieth design parameter, Maximum Gross Weight. Appendix B contains a complete listing of pairings. A simple data point graph (X vs. Y) was made of each pairing and, for the graphs that showed a clear relationship existed, data points are curve fitted yielding a curve equation with specific constants. Both the singular data points, and the curves, generated from the curve equations, are depicted graphically, reinforcing the closeness of the curve fits, and that a relationship does indeed exist.

TABLE 1
Summary Characteristics of Chosen Helicopters

Military Designator	Weight Class	Primary Service	Year of Manufacture	Year of Technology	Mission Purpose
AH64	Medium	USA	1983	1970	Attack
OH58C	Light	USA	1969-78	1960	Observation
SH-3H	Medium	USN	1961-72	1950	Utility
S-76	Medium	USN	1982	1970	Utility
UH-60A	Medium	USA	1979	1970	Utility
CH-54B	Heavy	USA	1974	1960	Utility
CH-53D	Heavy	USN (MC)	1969	1960	Utility
CH-53E	Heavy	USN	1981	1970	Utility
AH-1S	Medium	USA	1970-81	1960	Attack
UH-1H	Medium	USA	1965-76	1950	Utility

In addition to original programs, two pre-existing computer programs were used to facilitate the accomplishment of the thesis objective. The data point plots were generated with 'Helicopter Data Display', written by Captain Gary Bishop, USA, [Ref 1], and the curve fit evaluation was accomplished with 'Crvfit', a Hewlett-Packard hand-held computer program, written by Commander Pat Sullivan, USN, [Ref 2]. The 'Helicopter Data Display' graphic output was re-sized to meet the requirements for thesis submission, and the pre-existing data base revised with additions of data from 3 more helicopters, a deletion of 1, and correction of some incorrect data. The 'Crvfit' program was used as is, with an acceptance criteria, called the correlation factor, cf .8 or greater.

III. SOLUTION TO THE PROBLEM

Of the first 435 pairings, 153 were cut from consideration following an initial consultation with Thesis Advisor Prof. Donald Layton based on his own expertise. Those pairings disregarded from further evaluation are indicated by a prefixed "XX" in Appendix B. An example of pairings which were disregarded outright were those involving 'Degree Twist of Blades'. By experience, and verified thru conversations with helicopter company representatives, 'Twist of the Blade' has in the past been decided on by a 'what's on the shelf' selection criteria, thus explaining why some companies produce helicopters predominantly with a -10 degree twist, while others produce helicopters predominantly with a -8 degree twist, or, a 0 degree twist. 282 simple X-Y plots of the remaining pairings were then generated, with the first number of each pairing designated as the X-abscissa, or horizontal axis, and the second number, as the Y-ordinate, or vertical axis. Plots appear in Appendix C and are referenced with figure numbers consistent with the method used to reference the initial pairings (Example: Fig 1-30). The selection for further evaluation for determining curve fits was accomplished by empirically judging whether the data points tended to show that a relationship existed. Those figures referenced with a suffix 'a' indicate that a relationship does exist and a data point curve fit follows. The two examples are illustrated in Figures 3.1 and 3.2.

The data of the data points plots that were questionable were submitted to the Crvfit program which made the final decision as to whether there was an interrelationship with a resulting program correlation factor of .8 or greater.

HELICOPTER DESIGN

AE 4306/4900

- | | |
|-----------|-----------|
| 1. AH-64 | 6. CH-54B |
| 2. OH-58C | 7. CH-53D |
| 3. SH-3H | 8. CH-53E |
| 4. S-78 | 9. AH-1S |
| 5. UH-80A | 10. UH-1H |

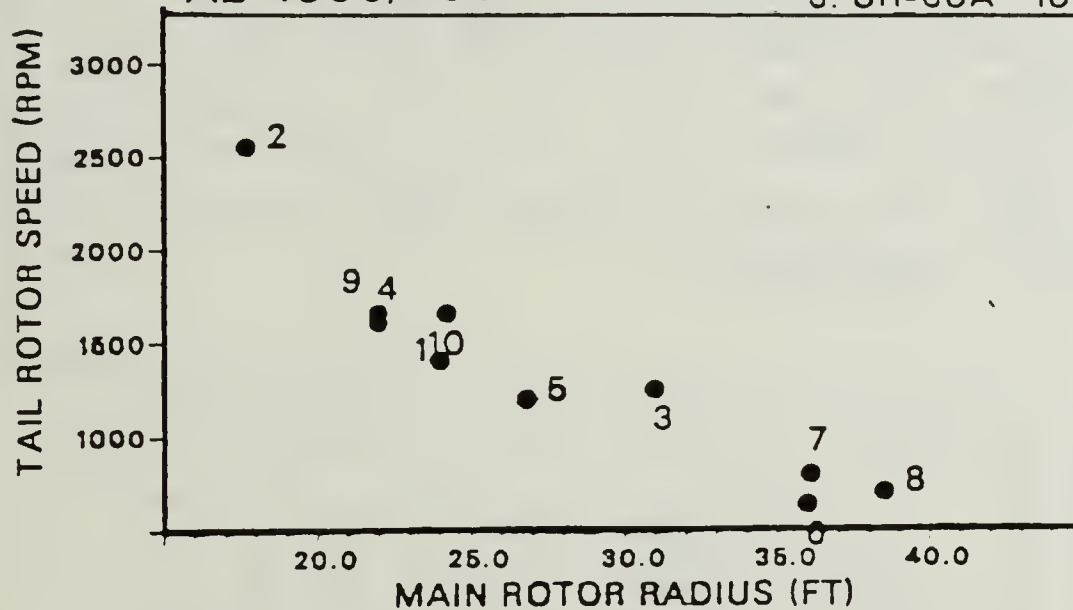


Figure 3.1 Data Point Plot Chosen to be Curve Fitted.

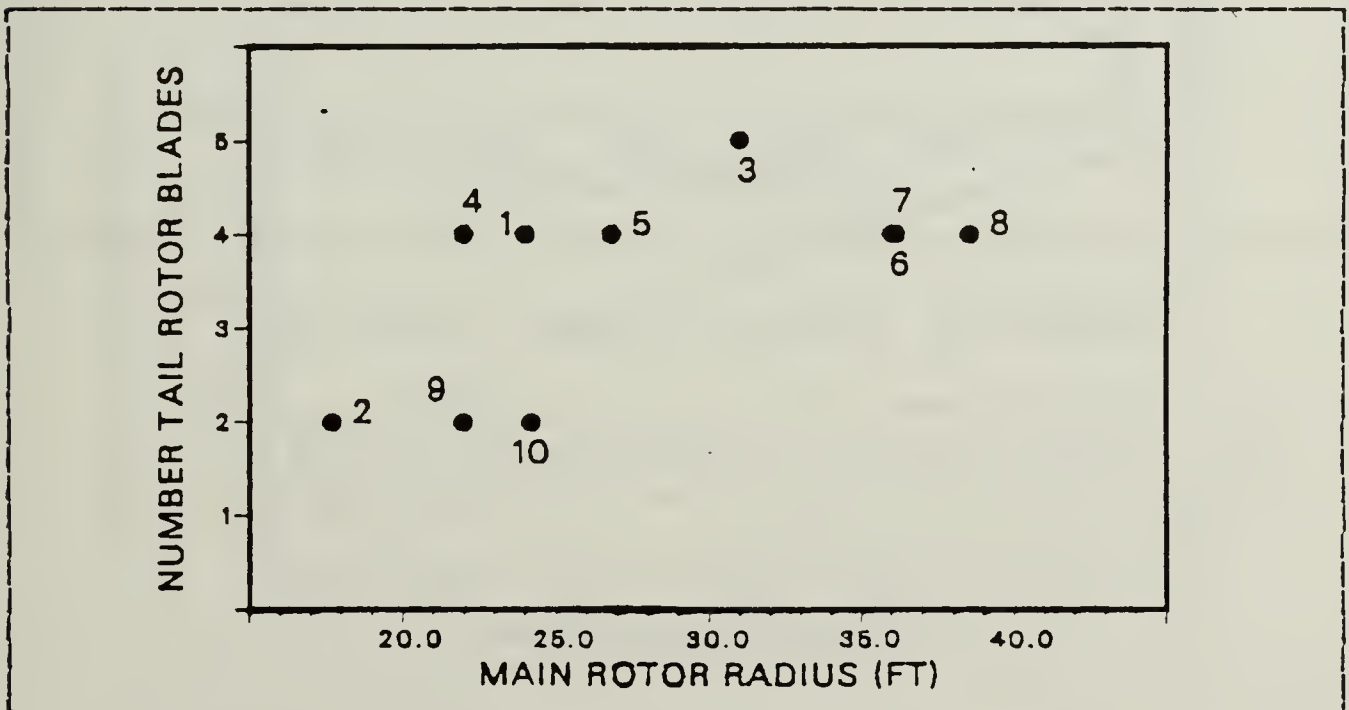


Figure 3.2 Data Point Plot Chosen Not to be Curve Fitted.

At the same time, the 'Crvfit' program determined which of 4 (four) curve types, linear (Type 1), exponential (Type 2), logarithmic (Type 3), or power (Type 4), best fit the data points plotted. An example of one of each of the 4 curves is illustrated in Figures 3.3 through 3.6. Curve fits for the respective pairings, referenced with a suffix 'b', indicating curve fit (Example: Fig 1-30b), and which includes the best curve fit equation, follow their respective data point plots in Appendix C.

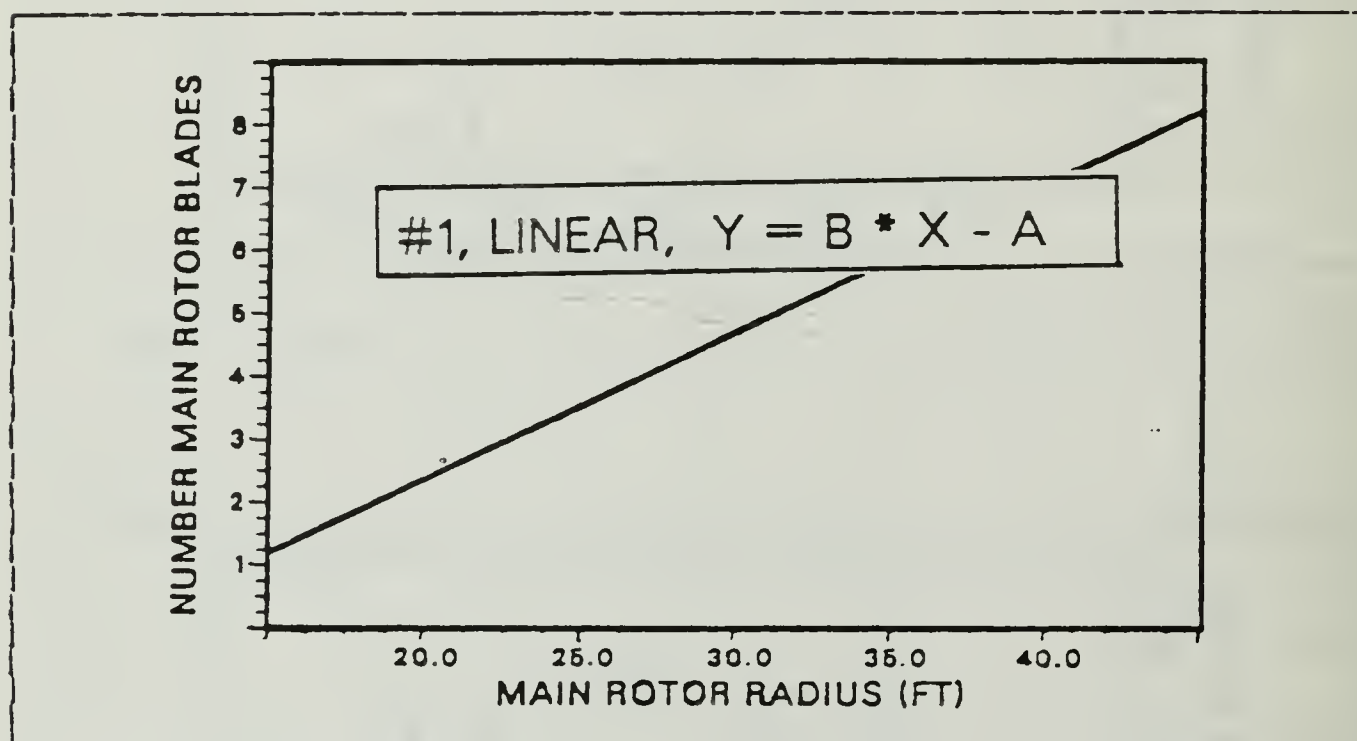


Figure 3.3 Example of Type 1 Curve Fit.

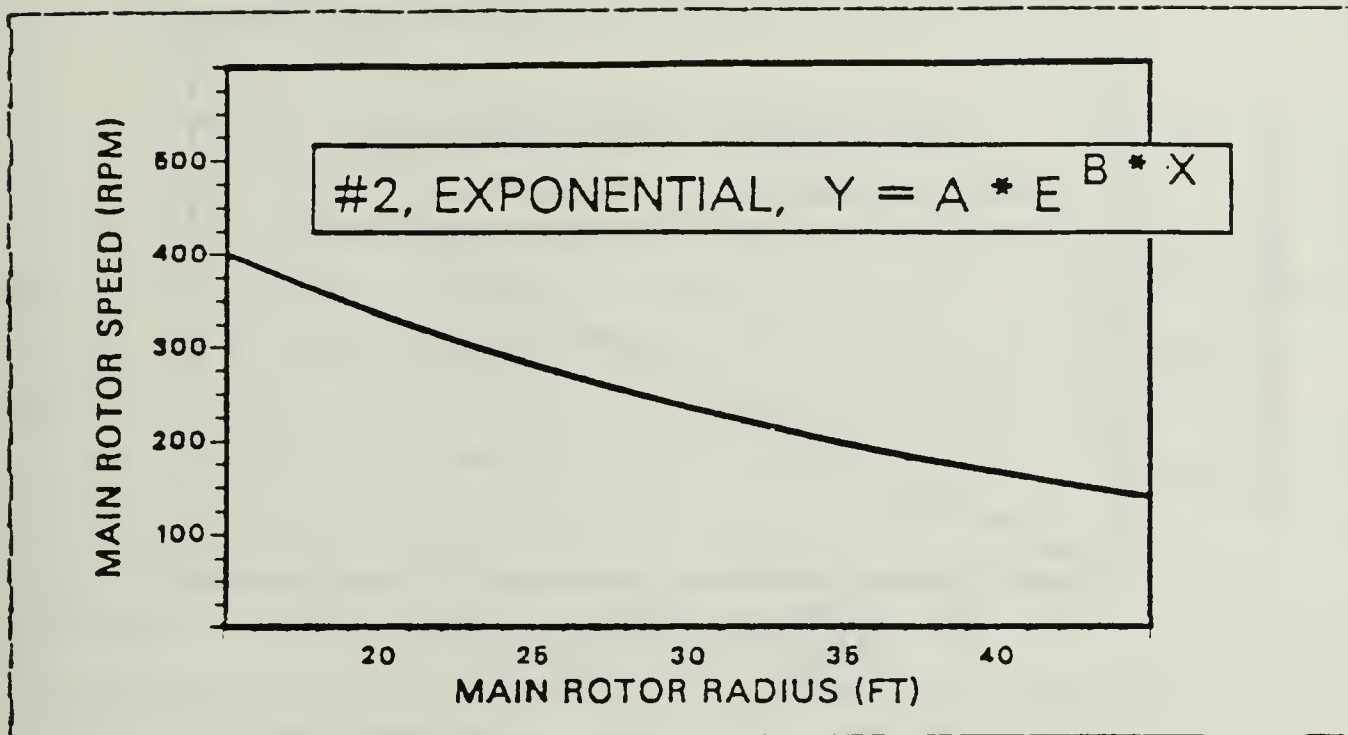


Figure 3.4 Example of Type 2 Curve Fit.

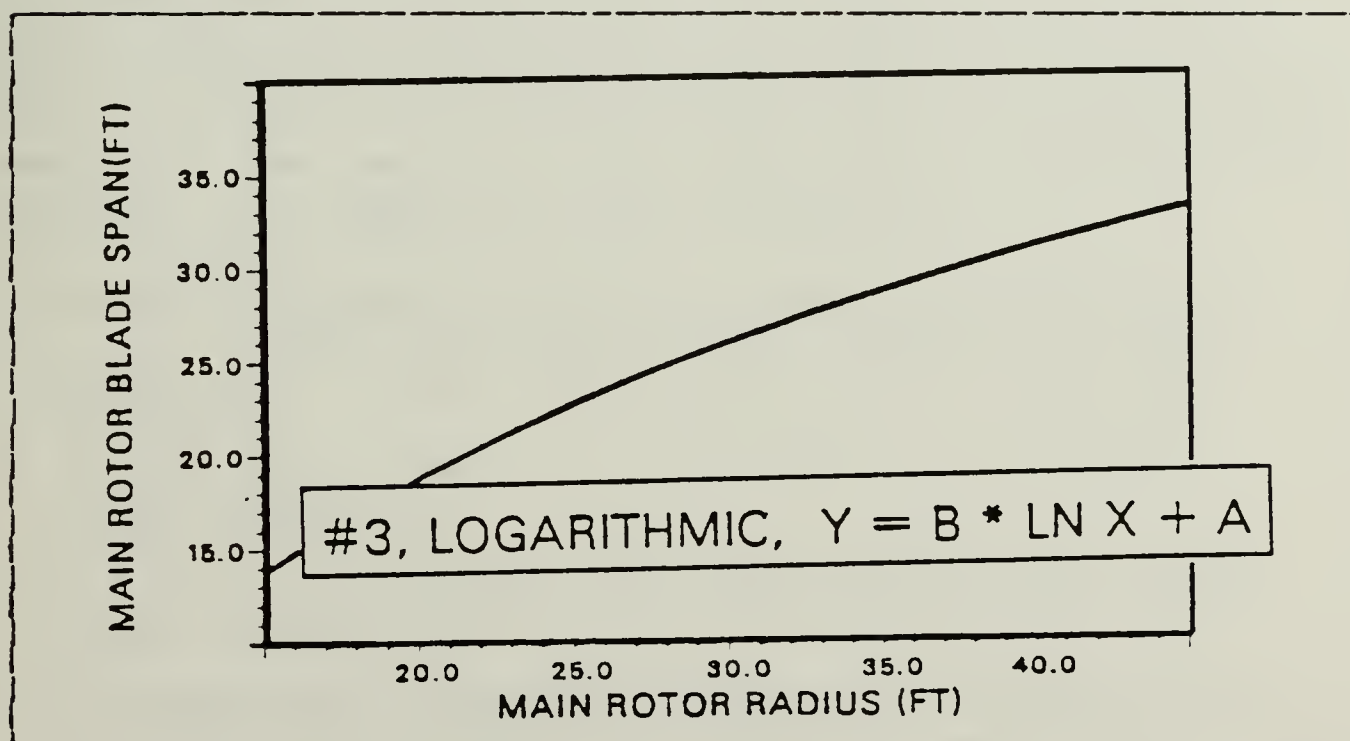


Figure 3.5 Example of Type 3 Curve Fit.

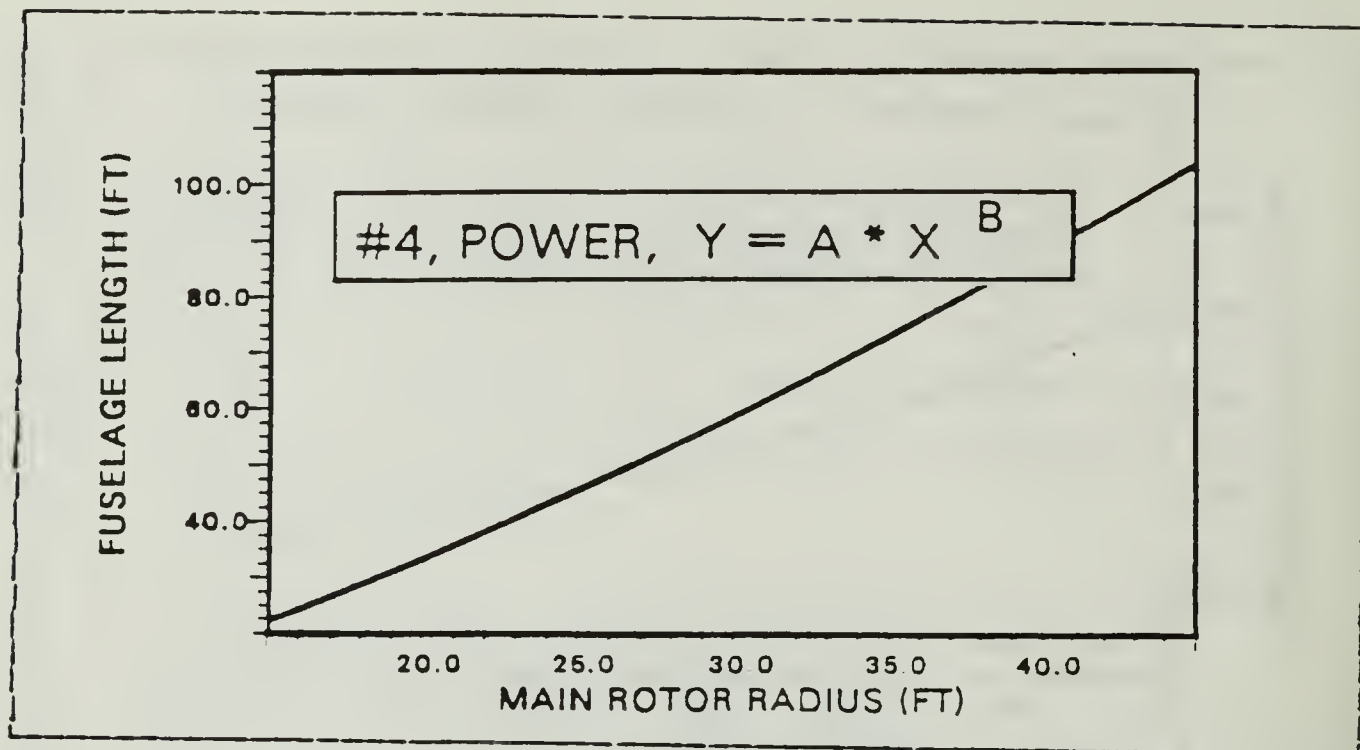


Figure 3.6 Example of Type 4 Curve Fit.

IV. RESULTS AND CONCLUSIONS

282 pairings were evaluated to determine whether an interrelationship existed between the selected design parameters. 185 were determined to produce positive curve fit data which met or exceeded the chosen correlation factor. Of the 30 design parameters selected for evaluation, the parameters Maximum Gross Weight and Operating Weight were most interactive, resulting in positive quantitative relationships with 16 other parameters. This is understandable for both parameters are geometric parameters, driven by mission and performance requirements and both influence many of the others. 10 design parameters had no influence, resulting in no relationship with any other parameter. A demonstration of the validity of the derived relationships is illustrated as follows where both the curve fit equation, and an alternate method (used in AE 4306 Helicopter Design Manual [Ref 3]), are used to generate specific design parameters of Gross Weight and Tail Rotor Radius. The results are compared to an existing, flying helicopter.

Required: Compute Gross Weight, MGW, as a function of
Tail Rotor Radius, RTR, given as 2.6 feet.

Curve Fit - $MGW = 324.88 \times RTR^{2.3829} = 3166 \text{ lbs}$
Equation

AE 4306 - $MGW = 591.716 \times RTR^{2.0} = 4000 \text{ lbs}$
Design Manual
(Alternate Method)

2.6 feet is the actual tail rotor radius of the OH58C
Army Observation/Scout Helicopter whose actual Gross
Weight is 2550 lbs.

By comparison, the curve fit equation generates a value
of Gross Weight 24% above actual design, whereas the
alternate method generates a value 52% above actual design.

Table 2 lists the number of relationships, or the influence
of each design parameter upon each other.

TABLE 2

Resultant Relationships of Design Parameters

TABLE 2
Resultant Relationships of Design Parameters

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total #	
1 Main Rotor Radius (ft)	X																															15
2 Tail Rotor Radius (ft)		X																														9
3 Number of Main Rotor Blades				X																												12
4 Number of Tail Rotor Blades																																2
5 Height of Main Rotor above ground (ft)						X																										6
6 Speed of Main Rotor System (rpm)							X																									11
7 Speed of Tail Rotor System (rpm)								X																								10
8 Chord of Main Rotor (ft)									X																							2
9 Chord of Tail Rotor (ft)											X																					8
10 Span of Main Rotor Blade (ft)																																7
11 Span of Tail Rotor Blade (ft)																																8
12 Twist of Main Rotor Blade (degrees)																																0
13 Twist of Tail Rotor Blade (degrees)																																0
14 Profile Drag of Main Rotor blade																																0
15 Profile Drag of Tail rotor blade																																2
16 Disc Loading of Main Rotor (lb/ft ²)																																8
17 Width of Fuselage (ft)																																0
18 Length of Fuselage (ft)																																11
19 Frontal Horizontal Flat Plate Area (sq ft)																																11
20 Frontal Vertical Flat Plate Area (sq ft)																																0
21 Maximum Forward Velocity (knots)																																0
22 Maximum Range (nm)																																0
23 Rate of Climb (fpm)																																0
24 Hover Ceiling (IGE)																																0
25 Hover Ceiling (OGE)																																0
26 Length of Tail (ft)																																13
27 Operating Weight (lb)																																16
28 Load Weight (lb)																																13
29 Fuel Weight (lb)																																5
30 Maximum Gross Weight (lb)																																16

A. CONCLUSIONS

The objective of this thesis has been achieved by establishing the clear relationships that exist between selected Helicopter design parameters. The curve fit equations that were derived, and the specific constants for each equation, provide the designer, be he professional, in the industry, or student, a means to quantitatively derive values of design parameters that are encountered during the preliminary design process.

Until technological breakthroughs force a drastic departure from the established design norms developed over the last 30 years, the curve fit equations can produce a quantitative, quicker, and more optimum solution than the methods employed to date.

APPENDIX A

REFERENCES FOR DATA BASE AND HELICOPTERS

A. SELECTED DESIGN PARAMETERS AND NOMENCLATURE

TABLE 3

Selected Design Parameters and Nomenclature

Selected Design Parameters		Nomenclature
1.	Main Rotor Radius (ft)	R
2.	Tail Rotor Radius (ft)	RTR
3.	Number of Main Rotor Blades	B
4.	Number of Tail Rotor Blades	BTR
5.	Height of Main Rotor System above Ground (ft)	HT
6.	Speed of Main Rotor System (rpm)	RPM
7.	Speed of Tail Rotor System (rpm)	RPMTR
8.	Chord of the Main Rotor (ft)	C
9.	Chord of the Tail Rotor (ft)	CTR
10.	Span of the Main Rotor Blade (ft)	BS
11.	Span of the Tail Rotor Blade (ft)	RSTR
12.	Twist of Main Rotor Blade (degrees)	TWST
13.	Twist of Tail Rotor Blade (degrees)	TWSTR
14.	Profile Drag of Main Rotor Blade	CDO
15.	Profile Drag of Tail Rotor Blade	CDO TR
16.	Disc Loading of Main Rotor System (lb/sq ft)	DL
17.	Width of the Fuselage (ft)	WDT
18.	Length of the Fuselage (ft)	LGE
19.	Frontal Horizontal Flat Plate Area (sq/ft)	FH
20.	Frontal Vertical Flat Plate Area (sq/ft)	FV
21.	Maximum Forward Velocity (knots)	VM
22.	Maximum Range (nm)	
23.	Rate of Climb, Maximum Continuous Power (fpm)	RC
24.	Hover Ceiling (IGE, in ground effect)	HOVIGE
25.	Hover Ceiling (OGE, out of ground effect)	HOVIGE
26.	Length of Tail (ft)	LT
27.	Operating Weight (lb)	OWT
28.	Load Weight (lb)	LWT
29.	Fuel Weight (lb)	FWT
30.	Maximum Gross Weight (lb)	MGW

E. SELECTED DESIGN PARAMETER VALUES

TABLE 4
Selected Design Parameter Values

TABLE 4
Summary of Design Parameter Values

	AH64	OH58C	SH3H	S76	UH60A	CH54E	CH53D	CH53E	AH1S	UH1H
1. Main Rotor Radius (ft)	24.	17.7	31.	22.	26.8	36.0	36.1	38.5	22.0	24.2
2. Tail Rotor Radius (ft)	4.6	2.6	5.3	4.0	5.5	8.0	8.0	10.0	4.25	4.25
3. Number Main Rotor Blades	4	2	5	4	4	6	6	7	2	2
4. Number Tail Rotor Blades	4	2	5	4	4	4	4	4	2	2
5. Height of Main Rotor above Ground (ft)	12.6	9.6	14.3	10.0	11.2	17.6	15.8	16.0	12.2	13.1
6. Speed of Main Rotor System (rpm)	289	354	203	293	258	185	185	179	324	324
7. Speed of Tail Rotor System (1000 rpm)	1.4	2.55	1.24	1.61	1.19	.631	.792	.699	1.65	1.65
8. Chord of Main Rotor (ft)	1.75	1.08	1.52	1.29	1.75	1.97	2.17	2.44	2.5	1.75
9. Chord of Tail Rotor (ft)	.83	.44	.61	.54	.81	1.28	1.28	1.28	.92	.70
10. Span Main Rotor Blade (ft)	18.8	16.2	29.3	25.0	23.3	29.8	28.9	28.6	18.9	22.0
11. Span Tail Rotor Blade (ft)	3.1	2.3	4.0	3.3	4.25	6.45	6.45	8.53	3.9	3.8
12. Twist of Main Rotor Blade (degrees)	-9	-10.6	-8	-10	-18	-8	-6	-13.6	-10	-10
13. Twist of Tail Rotor Blade (degrees)	-8.8	0.0	0.0	-8	-18	-8	-8	-8	0	0
14. Profile Drag of Main Rotor Blade	.009	.009	.009	.009	.008	.0095	.0095	.009	.008	.008
15. Profile Drag of Tail Rotor Blade	.009	.0095	.0105	.015	.008	.0105	.0095	.0095	.011	.011
16. Disc Loading of Main Rotor (lb/ft ²)	8.1	4.68	6.96	6.58	8.95	10.3	10.3	15.0	6.57	5.25
17. Width of Fuselage (ft)	3.96	4.57	7.08	7.0	7.75	7.08	8.83	8.83	11.7	8.6
18. Length of Fuselage (ft)	49.1	23.0	55.2	43.4	50.1	70.2	67.2	99.0	44.8	41.4
19. Frontal Horizontal Flat Plate Area (sq ft)	45.8	13.0	31.2	11.6	25.7	65.0	47.3	63.6	22.3	19.3
20. Frontal Vertical Flat Plate Area (sq ft)	34.7	15.8	36.0	30.0	30.8	99.4	90.0	120.	37.0	39.2
21. Maximum Forward Velocity (knots)	154	116	120	155	156	110	164	146	190	120
22. Maximum Range (nm)	246	330	505	404	275	200	242	400	290	266
23. Rate of Climb (1000 fpm)	2.88	1.42	1.31	1.35	.45	1.7	2.18	2.75	1.62	1.6
24. Hover Ceiling (IGE, 1000 ft)	14.2	7.1	3.7	6.2	7.8	6.3	14.0	6.0	12.2	12.5
25. Hover Ceiling (OGE, 1000 ft)	11.02	4.2	4.0	2.8	3.9	2.4	8.0	1.4	5.0	4.0
26. Length of Tail (ft)	29.7	15.2	36.6	26.5	31.5	44.5	44.5	48.0	21.7	20.9
27. Operating Weight (1000 lbs)	11.02	1.155	13.6	5.6	10.68	19.23	23.63	33.23	6.60	5.21
28. Load Weight (1000 lbs)	2.021	.995	1.759	2.517	7.226	14.19	14.03	24.79	1.64	2.869
29. Fuel Weight (1000 lbs)	1.624	.4	5.641	1.883	2.345	8.58	4.338	15.48	1.76	14.26
30. Max Gross Weight (1000 lbs)	14.6	2.55	21.0	10.0	20.25	42.0	42.0	73.5	10.0	9.5

C. HELICOPTER PLANFORMS AND PICTURES



Hughes YAH-64 Apache prototype during flight demonstrations in early 1982

HUGHES — AIRCRAFT: USA

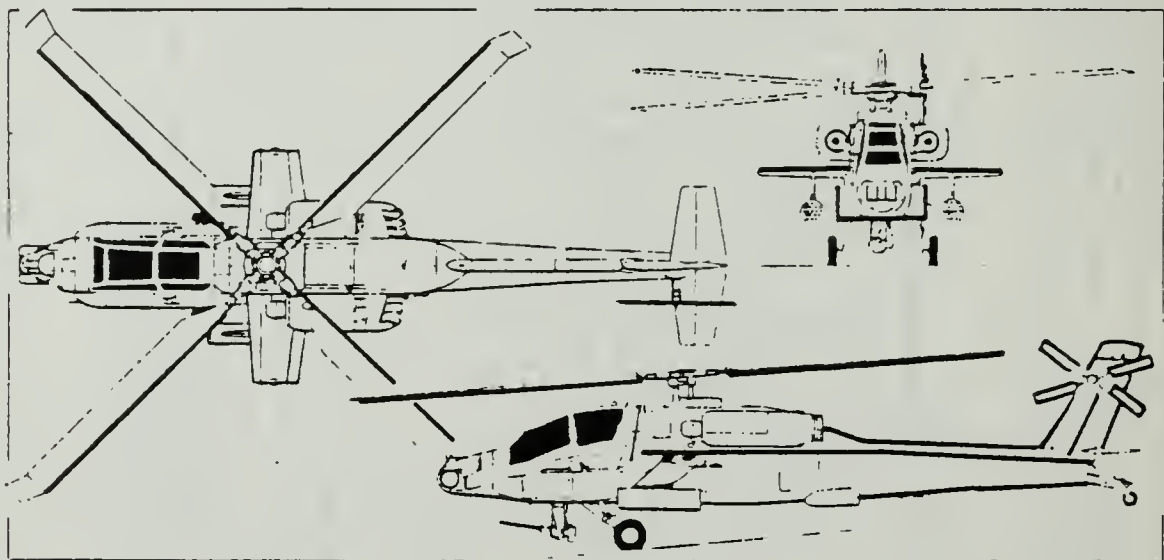


Figure A.1 AH64 Planform.



Bell OH-58A Kiowa turbine-powered light observation helicopter in U.S. Army service (*Norman Taylor*)

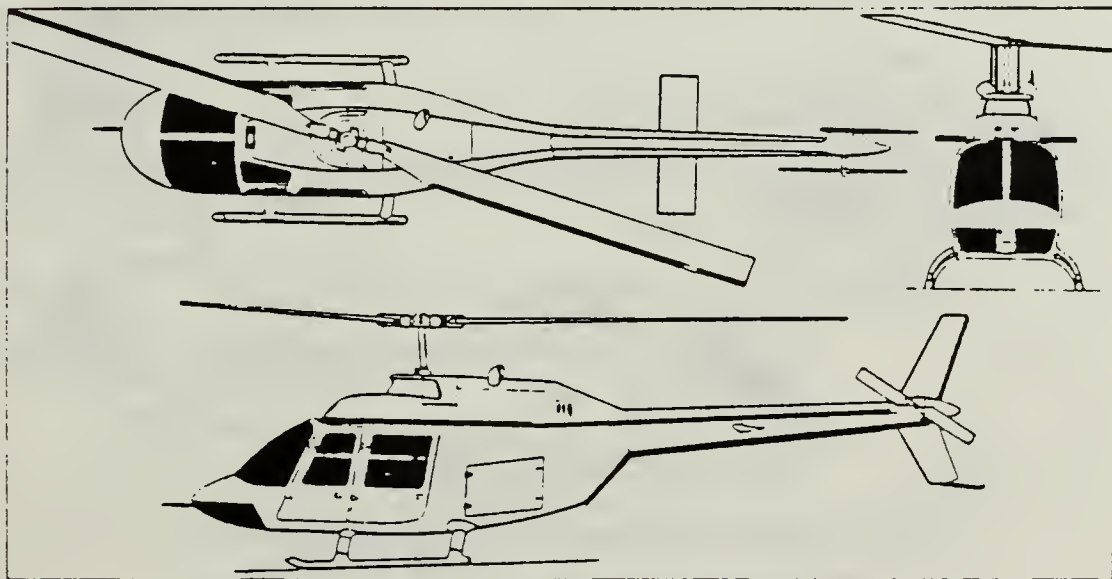
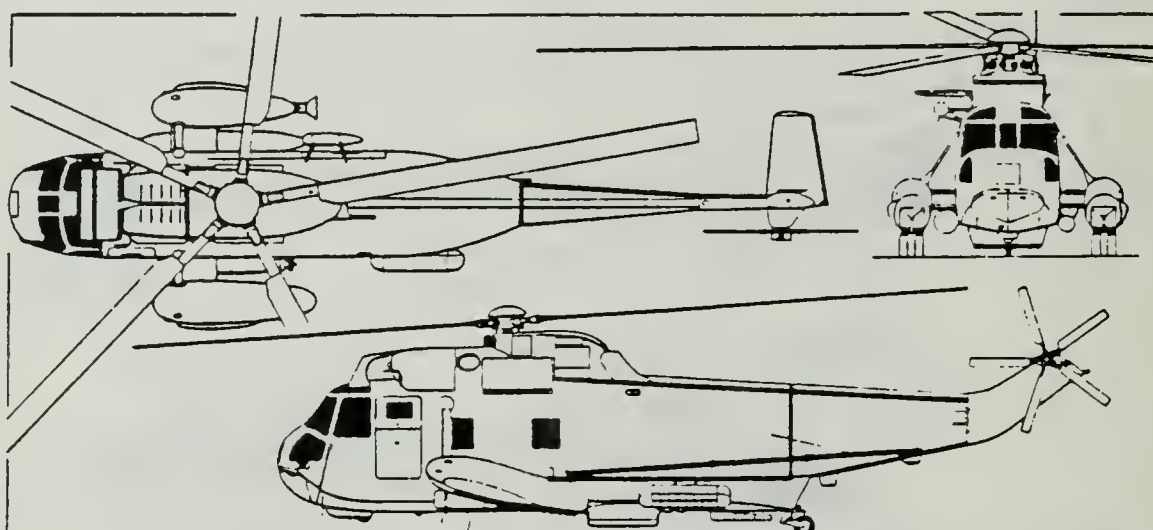


Figure A.2 OH58C Planform.



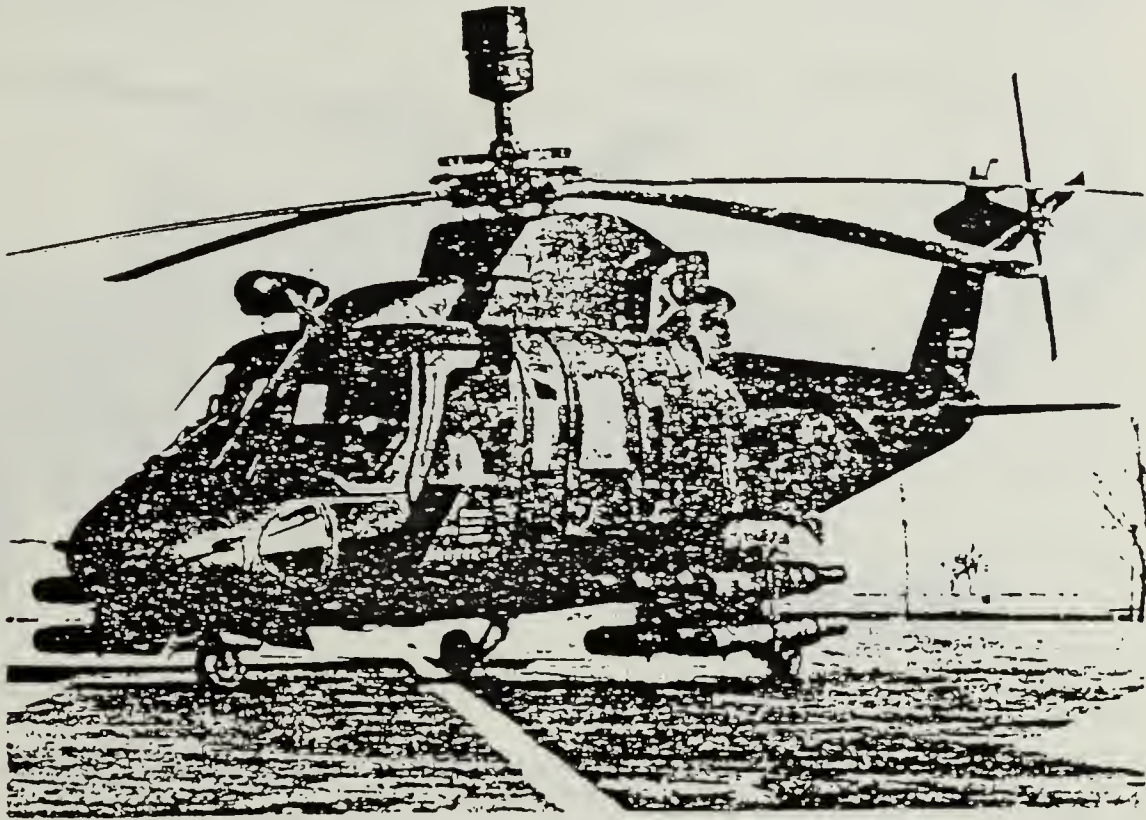
Sikorsky SH-3H multi-purpose helicopter for ASW and expansion of fleet missile defence

SIKORSKY — AIRCRAFT: USA 471

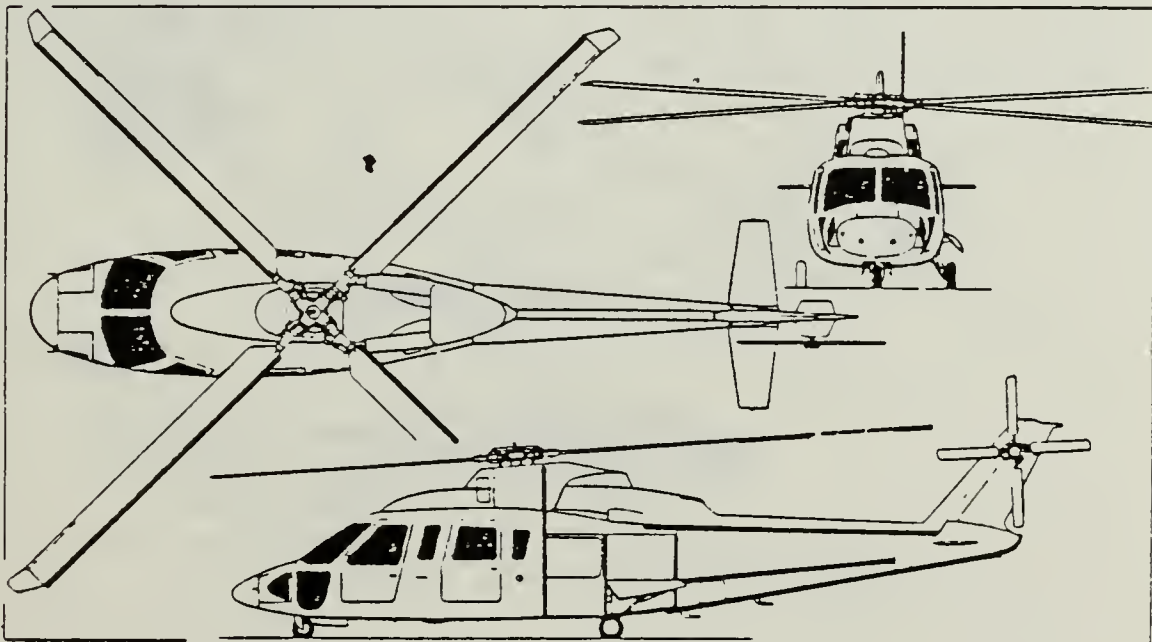


Sikorsky SH-3H twin-engined multi-purpose amphibious helicopter (*Pilot Press*)

Figure A.3 SH-3H Planform.



Sikorsky AUH-78 armed utility helicopter, with externally mounted anti-armour missiles

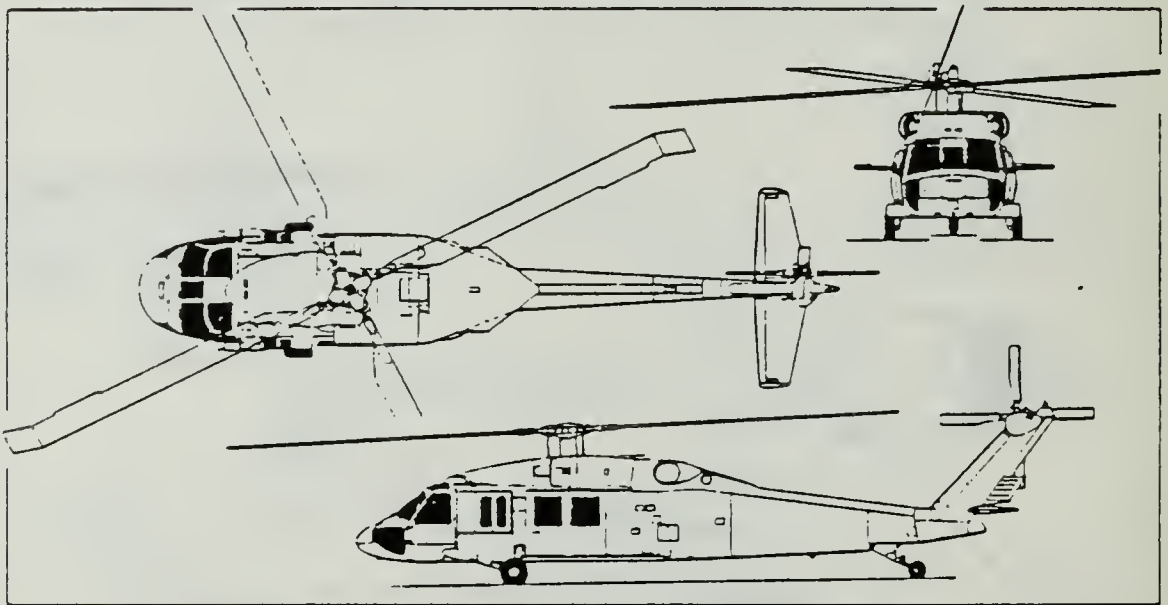


Sikorsky S-76 eight/twelve-passenger commercial transport helicopter (*Pilot Press*)

Figure A.4 S-76 Planform.

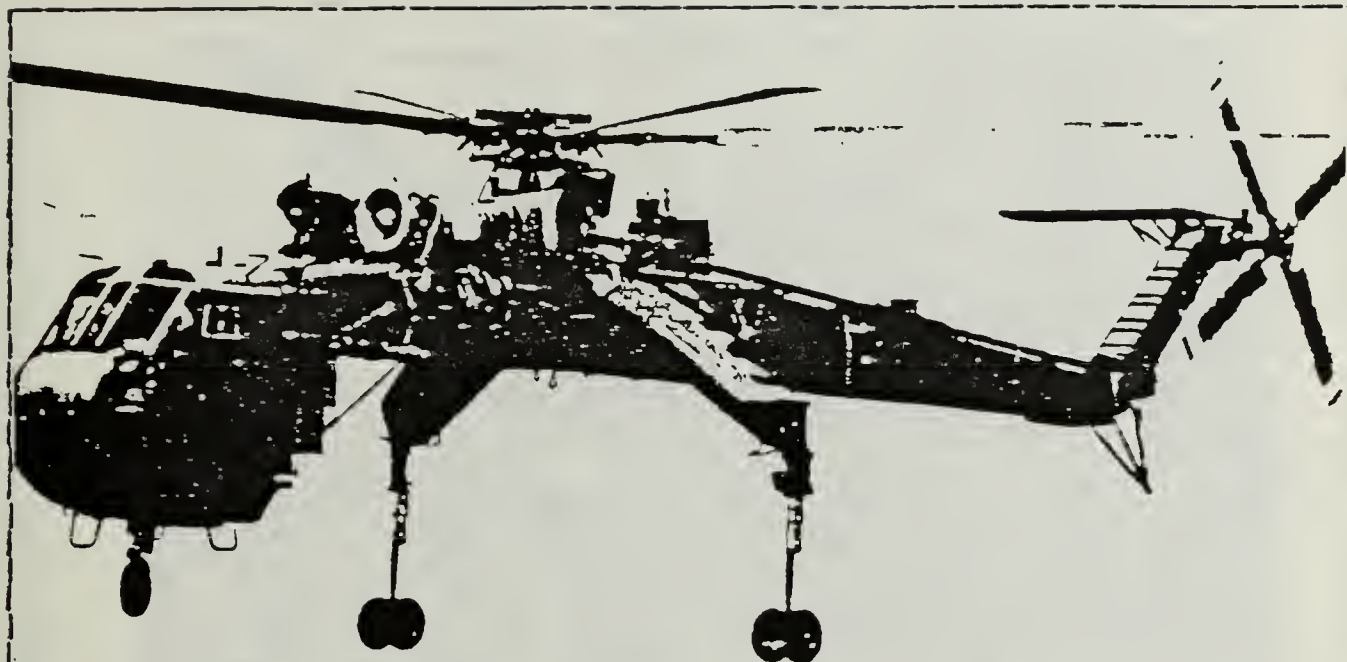


UH-60A Black Hawk, equipped with external stores support system, carrying 16 Hellfire missiles in flight qualification test



Sikorsky UH-60A Black Hawk combat assault helicopter (*Pilot Press*)

Figure A.5 UH-60A Planform.



Sikorsky CH-54B of the US Army new heavy-lift utility version of the Skycrane.

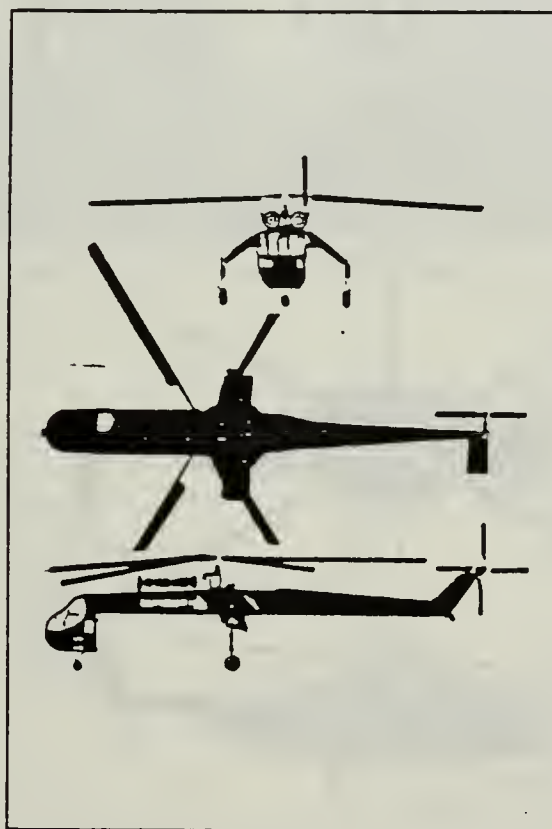
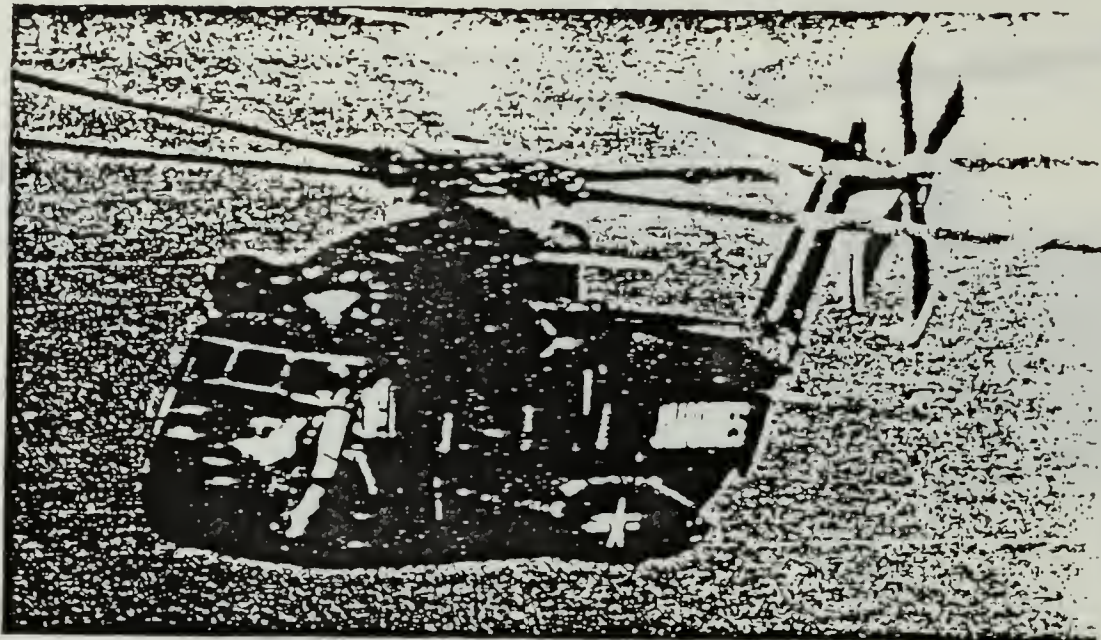


Figure A.6 CH-54B Planform.



Sikorsky CH-53D helicopter of the US Marine Corps

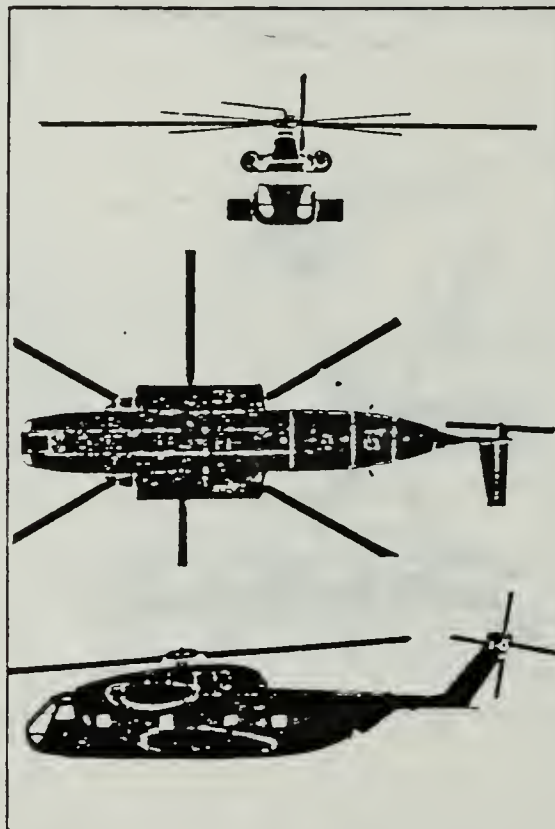
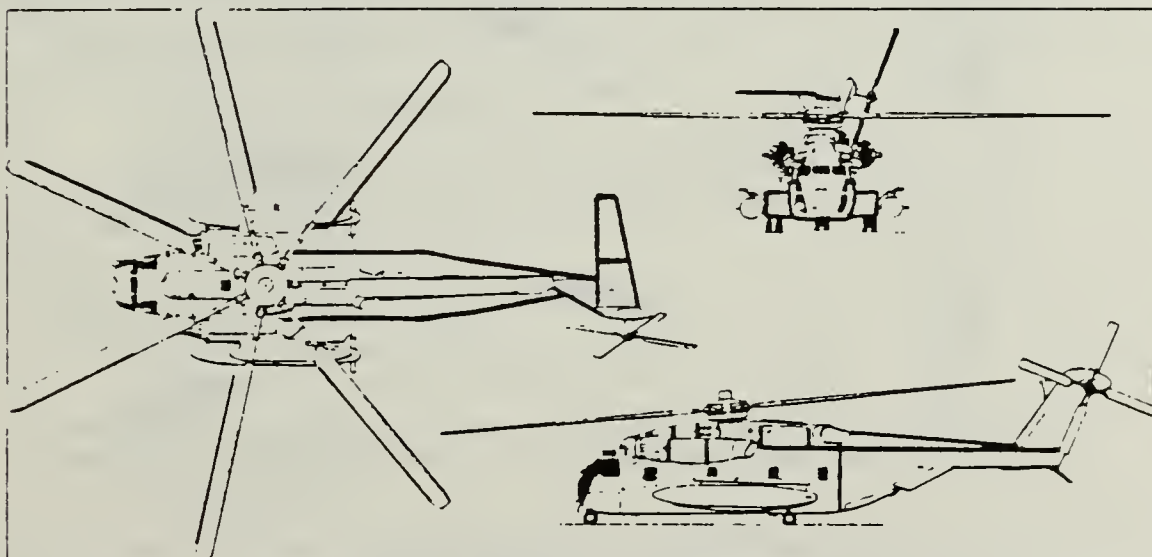


Figure A.7 CH-53D Planform.



Sikorsky CH-53E Super Stallion heavy-lift helicopter. (three General Electric T64-GE-416 turboshaft engines)

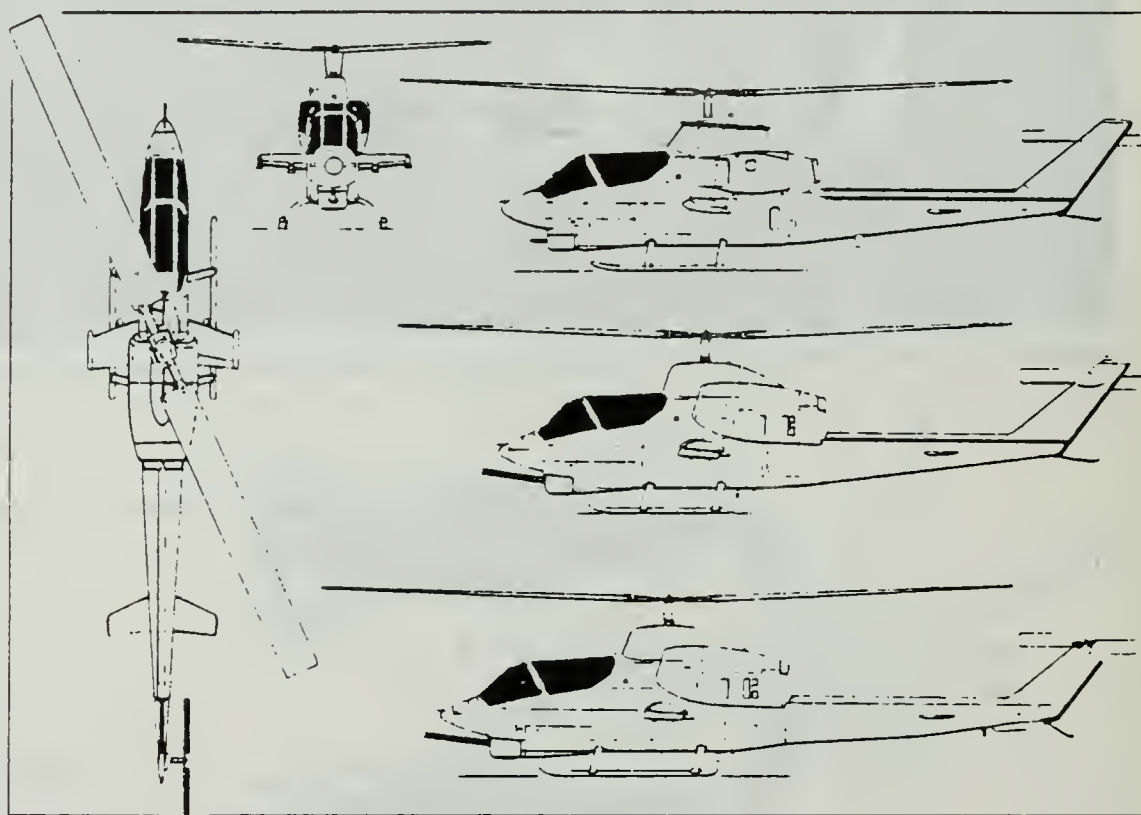


Sikorsky CH-53E Super Stallion heavy-lift helicopter (*Pilot Press*)

Figure A.8 CH-53E Planform.



Bell AH-1S TOW/Cobra with flat plate canopy and missile launchers (*J. M. G. Gradidge*)

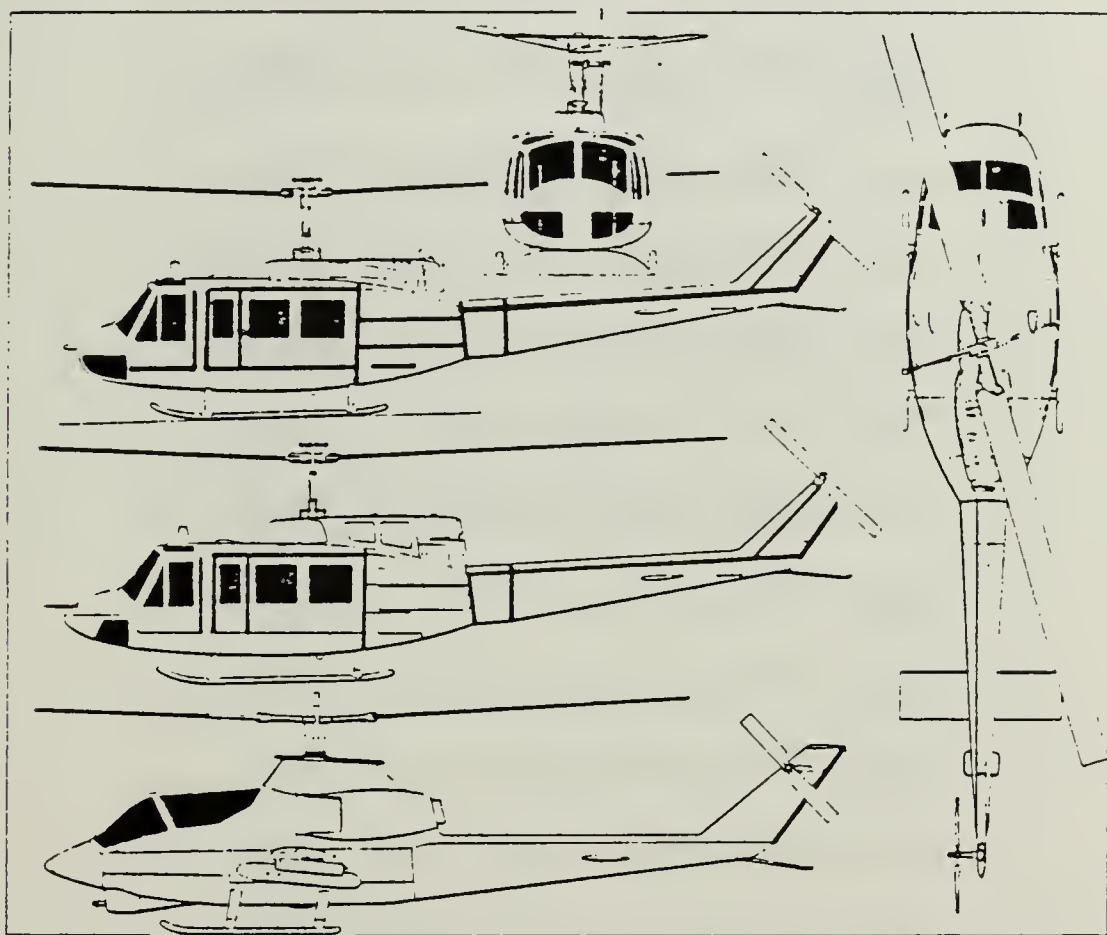


Bell AH-1T SeaCobra, with additional side views of AH-1J (centre) and AH-1G (top) (*Pilot Press*)

Figure A.9 AH-1S Planform.



Bell HH-1H Iroquois local base rescue helicopter in USAF service



Bell UH-1H Iroquois, with additional side views of UH-1N (centre) and AH-1G HueyCobra (bottom) (*Pilot Press*)

Figure A.10 UH-1H Planform.

APPENDIX B

CRITICAL DESIGN PARAMETER PAIRINGS AND REFERENCE SYSTEM

TABLE 5

Main Rotor Radius Pairings

	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	3	-	NUMBER OF MAIN ROTOR BLADES
	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	4	-	NUMBER OF TAIL ROTOR BLADES
	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
XX	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
XX	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
XX	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	1	-	MAIN ROTOR BLADE RADIUS IN FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET

- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 18 - LENGTH OF THE FUSELAGE IN FEET
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 19 - FRONTAL FLAT PLATE AREA IN SQUARE FEET
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 20 - VERTICAL FLAT PLATE AREA IN SQUARE FEET
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 21 - MAXIMUM VELOCITY IN KNOTS
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 22 - MAXIMUM RANGE IN NAUTICAL MILES
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 23 - RATE OF CLIMB IN FEET PER MINUTE,
MAXIMUM CONTINUOUS POWER
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 25 - HOVER CEILING (OUT OF GROUND EFFECT)
IN FEET
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 26 - LENGTH OF THE TAILBOOM IN FEET
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 27 - OPERATING WEIGHT IN POUNDS
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 28 - LOAD WEIGHT IN POUNDS
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 29 - FUEL WEIGHT IN POUNDS
- 1 - MAIN ROTOR BLADE RADIUS IN FEET
- 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 6
Tail Rotor Radius Pairings

XX	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	3	-	NUMBER OF MAIN ROTOR BLADES
	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	4	-	NUMBER OF TAIL ROTOR BLADES
XX	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
XX	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
XX	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
XX	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
XX	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
XX	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
XX	2	-	TAIL ROTOR BLADE RADIUS IN FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET

XX 2 - TAIL ROTOR BLADE RADIUS IN FEET
 19 - FRONTAL FLAT PLATE AREA IN SQUARE FEET
 XX 2 - TAIL ROTOR BLADE RADIUS IN FEET
 20 - VERTICAL FLAT PLATE AREA IN SQUARE FEET
 2 - TAIL ROTOR BLADE RADIUS IN FEET
 21 - MAXIMUM VELOCITY IN KNOTS
 XX 2 - TAIL ROTOR BLADE RADIUS IN FEET
 22 - MAXIMUM RANGE IN NAUTICAL MILES
 2 - TAIL ROTOR BLADE RADIUS IN FEET
 23 - RATE OF CLIMB IN FEET PER MINUTE,
 MAXIMUM CONTINUOUS POWER
 2 - TAIL ROTOR BLADE RADIUS IN FEET
 24 - HOVER CEILING (IN GROUND EFFECT)
 IN FEET
 2 - TAIL ROTOR BLADE RADIUS IN FEET
 25 - HOVER CEILING (CUT OF GROUND EFFECT)
 IN FEET
 2 - TAIL ROTOR BLADE RADIUS IN FEET
 26 - LENGTH OF THE TAILBOOM IN FEET
 2 - TAIL ROTOR BLADE RADIUS IN FEET
 27 - OPERATING WEIGHT IN POUNDS
 2 - TAIL ROTOR BLADE RADIUS IN FEET
 28 - LOAD WEIGHT IN POUNDS
 XX 2 - TAIL ROTOR BLADE RADIUS IN FEET
 29 - FUEL WEIGHT IN POUNDS
 2 - TAIL ROTOR BLADE RADIUS IN FEET
 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 7
Number of Main Rotor Blades Pairings

	3	-	NUMBER OF MAIN ROTOR BLADES
	4	-	NUMBER OF TAIL ROTOR BLADES
	3	-	NUMBER OF MAIN ROTOR BLADES
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	3	-	NUMBER OF MAIN ROTOR BLADES
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	3	-	NUMBER OF MAIN ROTOR BLADES
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	3	-	NUMBER OF MAIN ROTOR BLADES
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
XX	3	-	NUMBER OF MAIN ROTOR BLADES
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	3	-	NUMBER OF MAIN ROTOR BLADES
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
XX	3	-	NUMBER OF MAIN ROTOR BLADES
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	3	-	NUMBER OF MAIN ROTOR BLADES
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
XX	3	-	NUMBER OF MAIN ROTOR BLADES
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	3	-	NUMBER OF MAIN ROTOR BLADES
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
XX	3	-	NUMBER OF MAIN ROTOR BLADES
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
	3	-	NUMBER OF MAIN ROTOR BLADES
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	3	-	NUMBER OF MAIN ROTOR BLADES
	17	-	WIDTH OF THE FUSELAGE IN FEET
	3	-	NUMBER OF MAIN ROTOR BLADES
	18	-	LENGTH OF THE FUSELAGE IN FEET
	3	-	NUMBER OF MAIN ROTOR BLADES
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET

XX 3 - NUMBER OF MAIN ROTOR BLADES
 20 - VERTICAL FLAT PLATE AREA IN SQUARE FEET
 3 - NUMBER OF MAIN ROTOR BLADES
 21 - MAXIMUM VELOCITY IN KNOTS
 3 - NUMBER OF MAIN ROTOR BLADES
 22 - MAXIMUM RANGE IN NAUTICAL MILES
 3 - NUMBER OF MAIN ROTOR BLADES
 23 - RATE OF CLIMB IN FEET PER MINUTE,
 MAXIMUM CONTINUOUS POWER
 3 - NUMBER OF MAIN ROTOR BLADES
 24 - HOVER CEILING (IN GROUND EFFECT)
 IN FEET
 3 - NUMBER OF MAIN ROTOR BLADES
 25 - HOVER CEILING (OUT OF GROUND EFFECT)
 IN FEET
 3 - NUMBER OF MAIN ROTOR BLADES
 26 - LENGTH OF THE TAILBOOM IN FEET
 3 - NUMBER OF MAIN ROTOR BLADES
 27 - OPERATING WEIGHT IN POUNDS
 3 - NUMBER OF MAIN ROTOR BLADES
 28 - LOAD WEIGHT IN POUNDS
 3 - NUMBER OF MAIN ROTOR BLADES
 29 - FUEL WEIGHT IN POUNDS
 3 - NUMBER OF MAIN ROTOR BLADES
 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 8
Number of Tail Rotor Blades Pairings

XX	4	-	NUMBER OF TAIL ROTOR BLADES
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
XX	4	-	NUMBER OF TAIL ROTOR BLADES
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	4	-	NUMBER OF TAIL ROTOR BLADES
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
XX	4	-	NUMBER OF TAIL ROTOR BLADES
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	4	-	NUMBER OF TAIL ROTOR BLADES
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
XX	4	-	NUMBER OF TAIL ROTOR BLADES
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	4	-	NUMBER OF TAIL ROTOR BLADES
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
XX	4	-	NUMBER OF TAIL ROTOR BLADES
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	4	-	NUMBER OF TAIL ROTOR BLADES
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
XX	4	-	NUMBER OF TAIL ROTOR BLADES
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	4	-	NUMBER OF TAIL ROTOR BLADES
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
XX	4	-	NUMBER OF TAIL ROTOR BLADES
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	4	-	NUMBER OF TAIL ROTOR BLADES
	17	-	WIDTH OF THE FUSELAGE IN FEET
	4	-	NUMBER OF TAIL ROTOR BLADES
	18	-	LENGTH OF THE FUSELAGE IN FEET
XX	4	-	NUMBER OF TAIL ROTOR BLADES
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
XX	4	-	NUMBER OF TAIL ROTOR BLADES
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET

4 - NUMBER OF TAIL ROTOR BLADES
 21 - MAXIMUM VELOCITY IN KNOTS
 XX 4 - NUMBER OF TAIL ROTOR BLADES
 22 - MAXIMUM RANGE IN NAUTICAL MILES
 XX 4 - NUMBER OF TAIL ROTOR BLADES
 23 - RATE OF CLIMB IN FEET PER MINUTE,
 MAXIMUM CONTINUOUS POWER
 4 - NUMBER OF TAIL ROTOR BLADES
 24 - HOVER CEILING (IN GROUND EFFECT)
 IN FEET
 4 - NUMBER OF TAIL ROTOR BLADES
 25 - HOVER CEILING (OUT OF GROUND EFFECT)
 IN FEET
 4 - NUMBER OF TAIL ROTOR BLADES
 26 - LENGTH OF THE TAILBOOM IN FEET
 4 - NUMBER OF TAIL ROTOR BLADES
 27 - OPERATING WEIGHT IN POUNDS
 4 - NUMBER OF TAIL ROTOR BLADES
 28 - LOAD WEIGHT IN POUNDS
 4 - NUMBER OF TAIL ROTOR BLADES
 29 - FUEL WEIGHT IN POUNDS
 4 - NUMBER OF TAIL ROTOR BLADES
 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 9

Height of Main Rotor System Pairings

	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
XX	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
XX	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
XX	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
XX	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
XX	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
XX	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
XX	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET
	21	-	MAXIMUM VELOCITY IN KNOTS

- XX 5 - HEIGHT OF MAIN ROTOR SYSTEM ABOVE
GROUND IN FEET
- 22 - MAXIMUM RANGE IN NAUTICAL MILES
- 5 - HEIGHT OF MAIN ROTOR SYSTEM ABOVE
GROUND IN FEET
- 23 - RATE OF CLIMB IN FEET PER MINUTE,
MAXIMUM CONTINUOUS POWER
- 5 - HEIGHT OF MAIN ROTOR SYSTEM ABOVE
GROUND IN FEET
- 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 5 - HEIGHT OF MAIN ROTOR SYSTEM ABOVE
GROUND IN FEET
- 25 - HOVER CEILING (CUT OF GROUND EFFECT)
IN FEET
- 5 - HEIGHT OF MAIN ROTOR SYSTEM ABOVE
GROUND IN FEET
- 26 - LENGTH OF THE TAILBOOM IN FEET
- 5 - HEIGHT OF MAIN ROTOR SYSTEM ABOVE
GROUND IN FEET
- 27 - OPERATING WEIGHT IN POUNDS
- 5 - HEIGHT OF MAIN ROTOR SYSTEM ABOVE
GROUND IN FEET
- 28 - LOAD WEIGHT IN POUNDS
- XX 5 - HEIGHT OF MAIN ROTOR SYSTEM ABOVE
GROUND IN FEET
- 29 - FUEL WEIGHT IN POUNDS
- 5 - HEIGHT OF MAIN ROTOR SYSTEM ABOVE
GROUND IN FEET
- 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 10
Speed of Main Rotor Pairings

	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
XX	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
XX	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
XX	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
XX	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	17	-	WIDTH OF THE FUSELAGE IN FEET
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	18	-	LENGTH OF THE FUSELAGE IN FEET
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	21	-	MAXIMUM VELOCITY IN KNOTS
XX	6	-	SPEED OF MAIN ROTOR SYSTEM IN RPM
	22	-	MAXIMUM RANGE IN NAUTICAL MILES

- 6 - SPEED OF MAIN ROTOR SYSTEM IN RPM
- 23 - RATE OF CLIMB IN FEET PER MINUTE,
MAXIMUM CONTINUOUS POWER
- 6 - SPEED OF MAIN ROTOR SYSTEM IN RPM
- 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 6 - SPEED OF MAIN ROTOR SYSTEM IN RPM
- 25 - HOVER CEILING (OUT OF GROUND EFFECT)
IN FEET
- XX 6 - SPEED OF MAIN ROTOR SYSTEM IN RPM
- 26 - LENGTH OF THE TAILBOOM IN FEET
- 6 - SPEED OF MAIN ROTOR SYSTEM IN RPM
- 27 - OPERATING WEIGHT IN POUNDS
- 6 - SPEED OF MAIN ROTOR SYSTEM IN RPM
- 28 - LOAD WEIGHT IN POUNDS
- XX 6 - SPEED OF MAIN ROTOR SYSTEM IN RPM
- 29 - FUEL WEIGHT IN POUNDS
- 6 - SPEED OF MAIN ROTOR SYSTEM IN RPM
- 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 11

Speed of Tail Rotor Radius Pairings

XX	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
XX	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
XX	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
XX	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	17	-	WIDTH OF THE FUSELAGE IN FEET
XX	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	18	-	LENGTH OF THE FUSELAGE IN FEET
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
XX	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	21	-	MAXIMUM VELOCITY IN KNOTS
XX	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
XX	7	-	SPEED OF TAIL ROTOR SYSTEM IN RPM
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER

- 7 - SPEED OF TAIL ROTOR SYSTEM IN RPM
- 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 7 - SPEED OF TAIL ROTOR SYSTEM IN RPM
- 25 - HOVER CEILING (OUT OF GROUND EFFECT)
IN FEET
- 7 - SPEED OF TAIL ROTOR SYSTEM IN RPM
- 26 - LENGTH OF THE TAILBOOM IN FEET
- 7 - SPEED OF TAIL ROTOR SYSTEM IN RPM
- 27 - OPERATING WEIGHT IN POUNDS
- 7 - SPEED OF TAIL ROTOR SYSTEM IN RPM
- 28 - LOAD WEIGHT IN POUNDS
- XX 7 - SPEED OF TAIL ROTOR SYSTEM IN RPM
- 29 - FUEL WEIGHT IN POUNDS
- 7 - SPEED OF TAIL ROTOR SYSTEM IN RPM
- 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 12

Chord of Main Rotor Blade Pairings

	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
XX	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
XX	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
XX	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	21	-	MAXIMUM VELOCITY IN KNOTS
XX	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
XX	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
	8	-	CHORD OF MAIN ROTOR BLADE IN FEET
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET

8 - CHORD OF MAIN ROTOR BLADE IN FEET
25 - HOVER CEILING (CUT OF GROUND EFFECT)
IN FEET

8 - CHORD OF MAIN ROTOR BLADE IN FEET
26 - LENGTH OF THE TAILBOOM IN FEET

8 - CHORD OF MAIN ROTOR BLADE IN FEET
27 - OPERATING WEIGHT IN POUNDS

8 - CHORD OF MAIN ROTOR BLADE IN FEET
28 - LOAD WEIGHT IN POUNDS

XX 8 - CHORD OF MAIN ROTOR BLADE IN FEET
29 - FUEL WEIGHT IN POUNDS

8 - CHORD OF MAIN ROTOR BLADE IN FEET
30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 13

Chord of Tail Rotor Blade Pairings

XX	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
XX	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
XX	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
XX	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
XX	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET
XX	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
XX	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	21	-	MAXIMUM VELOCITY IN KNOTS
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
XX	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
	9	-	CHORD OF TAIL ROTOR BLADE IN FEET
	25	-	HOVER CEILING (OUT OF GROUND EFFECT) IN FEET

9 - CHORD OF TAIL ROTOR BLADE IN FEET
 26 - LENGTH OF THE TAILBOOM IN FEET
 9 - CHORD OF TAIL ROTOR BLADE IN FEET
 27 - OPERATING WEIGHT IN POUNDS
 9 - CHORD OF TAIL ROTOR BLADE IN FEET
 28 - LOAD WEIGHT IN POUNDS
 XX 9 - CHORD OF TAIL ROTOR BLADE IN FEET
 29 - FUEL WEIGHT IN POUNDS
 9 - CHORD OF TAIL ROTOR BLADE IN FEET
 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 14
Span of Main Rotor Pairings

	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
XX	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
XX	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	21	-	MAXIMUM VELOCITY IN KNOTS
XX	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	25	-	HOVER CEILING (OUT OF GROUND EFFECT) IN FEET
	10	-	SPAN OF MAIN ROTOR BLADE IN FEET
	26	-	LENGTH OF THE TAILBOOM IN FEET

10 - SPAN OF MAIN ROTOR BLADE IN FEET
27 - OPERATING WEIGHT IN POUNDS

10 - SPAN OF MAIN ROTOR BLADE IN FEET
28 - LOAD WEIGHT IN POUNDS

XX 10 - SPAN OF MAIN ROTOR BLADE IN FEET
29 - FUEL WEIGHT IN POUNDS

10 - SPAN OF MAIN ROTOR BLADE IN FEET
30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 15
Span of Tail Rotor Pairings

	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
XX	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
XX	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
XX	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	21	-	MAXIMUM VELOCITY IN KNOTS
XX	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
XX	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	25	-	HOVER CEILING (OUT OF GROUND EFFECT) IN FEET
	11	-	SPAN OF TAIL ROTOR BLADE IN FEET
	26	-	LENGTH OF THE TAILBOOM IN FEET

11 - SPAN OF TAIL ROTOR BLADE IN FEET
27 - OPERATING WEIGHT IN POUNDS
11 - SPAN OF TAIL ROTOR BLADE IN FEET
28 - LOAD WEIGHT IN POUNDS
XX 11 - SPAN OF TAIL ROTOR BLADE IN FEET
29 - FUEL WEIGHT IN POUNDS
11 - SPAN OF TAIL ROTOR BLADE IN FEET
30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 16

Twist of Main Rotor Blade Pairings

	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	17	-	WIDTH OF THE FUSELAGE IN FEET
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	18	-	LENGTH OF THE FUSELAGE IN FEET
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	21	-	MAXIMUM VELOCITY IN KNOTS
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	25	-	HOVER CEILING (OUT OF GROUND EFFECT) IN FEET
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	26	-	LENGTH OF THE TAILBOOM IN FEET
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	27	-	OPERATING WEIGHT IN POUNDS
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	28	-	LOAD WEIGHT IN POUNDS
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	29	-	FUEL WEIGHT IN POUNDS
XX	12	-	TWIST OF MAIN ROTOR BLADE IN DEGREES
	30	-	MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 17

Twist of Tail Rotor Blade Pairings

XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	17	-	WIDTH OF THE FUSELAGE IN FEET
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	18	-	LENGTH OF THE FUSELAGE IN FEET
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	21	-	MAXIMUM VELOCITY IN KNOTS
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	25	-	HOVER CEILING (OUT OF GROUND EFFECT) IN FEET
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	26	-	LENGTH OF THE TAILBOOM IN FEET
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	27	-	OPERATING WEIGHT IN POUNDS
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	28	-	LOAD WEIGHT IN POUNDS
XX	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	29	-	FUEL WEIGHT IN POUNDS
	13	-	TWIST OF TAIL ROTOR BLADE IN DEGREES
	30	-	MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 18

Profile Drag of Main Rotor Blade Pairings

	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	15	-	PROFILE DRAG OF TAIL ROTOR BLADE
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	17	-	WIDTH OF THE FUSELAGE IN FEET
XX	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	18	-	LENGTH OF THE FUSELAGE IN FEET
XX	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
XX	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	21	-	MAXIMUM VELOCITY IN KNOTS
XX	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	25	-	HOVER CEILING (OUT OF GROUND EFFECT) IN FEET
XX	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	26	-	LENGTH OF THE TAILBOOM IN FEET
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	27	-	OPERATING WEIGHT IN POUNDS
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	28	-	LOAD WEIGHT IN POUNDS
XX	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	29	-	FUEL WEIGHT IN POUNDS
	14	-	PROFILE DRAG OF MAIN ROTOR BLADE
	30	-	MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 19

Profile Drag of Tail Rotor Blade Pairings

XX	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	16	- DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	17	- WIDTH OF THE FUSELAGE IN FEET
	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	18	- LENGTH OF THE FUSELAGE IN FEET
XX	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	19	- FRONTAL FLAT PLATE AREA IN SQUARE FEET
XX	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	20	- VERTICAL FLAT PLATE AREA IN SQUARE FEET
	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	21	- MAXIMUM VELOCITY IN KNOTS
XX	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	22	- MAXIMUM RANGE IN NAUTICAL MILES
	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	23	- RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	24	- HOVER CEILING (IN GROUND EFFECT) IN FEET
	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	25	- HOVER CEILING (OUT OF GROUND EFFECT) IN FEET
	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	26	- LENGTH OF THE TAILBOOM IN FEET
	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	27	- OPERATING WEIGHT IN POUNDS
	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	28	- LOAD WEIGHT IN POUNDS
XX	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	29	- FUEL WEIGHT IN POUNDS
	15	- PROFILE DRAG OF TAIL ROTOR BLADE
	30	- MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 20

Disc Loading of the Main Rotor System Pairings

	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	17	-	WIDTH OF THE FUSELAGE IN FEET
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	18	-	LENGTH OF THE FUSELAGE IN FEET
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	21	-	MAXIMUM VELOCITY IN KNOTS
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
XX	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	25	-	HOVER CEILING (OUT OF GROUND EFFECT) IN FEET
XX	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	26	-	LENGTH OF THE TAILBOOM IN FEET
XX	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	27	-	OPERATING WEIGHT IN POUNDS
XX	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	28	-	LOAD WEIGHT IN POUNDS
XX	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	29	-	FUEL WEIGHT IN POUNDS
	16	-	DISC LOADING OF THE MAIN ROTOR SYSTEM
	30	-	MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 21

Width of the Fuselage Pairings

	17	-	WIDTH OF THE FUSELAGE IN FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
	21	-	MAXIMUM VELOCITY IN KNOTS
XX	17	-	WIDTH OF THE FUSELAGE IN FEET
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
	17	-	WIDTH OF THE FUSELAGE IN FEET
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
	17	-	WIDTH OF THE FUSELAGE IN FEET
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
	25	-	HOVER CEILING (OUT OF GROUND EFFECT) IN FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
	26	-	LENGTH OF THE TAILBOOM IN FEET
	17	-	WIDTH OF THE FUSELAGE IN FEET
	27	-	OPERATING WEIGHT IN POUNDS
	17	-	WIDTH OF THE FUSELAGE IN FEET
	28	-	LOAD WEIGHT IN POUNDS
	17	-	WIDTH OF THE FUSELAGE IN FEET
	29	-	FUEL WEIGHT IN POUNDS
	17	-	WIDTH OF THE FUSELAGE IN FEET
	30	-	MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 22
Length of Fuselage Pairings

	18	-	LENGTH OF THE FUSELAGE IN FEET
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET
	21	-	MAXIMUM VELOCITY IN KNOTS
	18	-	LENGTH OF THE FUSELAGE IN FEET
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
	18	-	LENGTH OF THE FUSELAGE IN FEET
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
	18	-	LENGTH OF THE FUSELAGE IN FEET
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET
	25	-	HOVER CEILING (OUT OF GROUND EFFECT) IN FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET
	26	-	LENGTH OF THE TAILBOOM IN FEET
	18	-	LENGTH OF THE FUSELAGE IN FEET
	27	-	OPERATING WEIGHT IN POUNDS
	18	-	LENGTH OF THE FUSELAGE IN FEET
	28	-	LOAD WEIGHT IN POUNDS
XX	18	-	LENGTH OF THE FUSELAGE IN FEET
	29	-	FUEL WEIGHT IN POUNDS
	18	-	LENGTH OF THE FUSELAGE IN FEET
	30	-	MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 23

Frontal Horizontal Flat Plate Area Pairings

	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	21	-	MAXIMUM VELOCITY IN KNOTS
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
XX	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
XX	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
XX	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	25	-	HOVER CEILING (OUT OF GROUND EFFECT) IN FEET
XX	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	26	-	LENGTH OF THE TAILBOOM IN FEET
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	27	-	OPERATING WEIGHT IN POUNDS
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	28	-	LOAD WEIGHT IN POUNDS
XX	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	29	-	FUEL WEIGHT IN POUNDS
	19	-	FRONTAL FLAT PLATE AREA IN SQUARE FEET
	30	-	MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 24

Frontal Vertical Flat Plate Area Pairings

XX	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	21	-	MAXIMUM VELOCITY IN KNOTS
XX	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUOUS POWER
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	25	-	HOVER CEILING (CUT OF GROUND EFFECT) IN FEET
XX	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	26	-	LENGTH OF THE TAILBOOM IN FEET
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	27	-	OPERATING WEIGHT IN POUNDS
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	28	-	LOAD WEIGHT IN POUNDS
XX	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	29	-	FUEL WEIGHT IN POUNDS
	20	-	VERTICAL FLAT PLATE AREA IN SQUARE FEET
	30	-	MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 25

Maximum Forward Velocity Pairings

- 21 - MAXIMUM VELOCITY IN KNOTS
- 22 - MAXIMUM RANGE IN NAUTICAL MILES
- 21 - MAXIMUM VELOCITY IN KNOTS
- 23 - RATE OF CLIMB IN FEET PER MINUTE,
MAXIMUM CONTINUOUS POWER
- 21 - MAXIMUM VELOCITY IN KNOTS
- 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 21 - MAXIMUM VELOCITY IN KNOTS
- 25 - HOVER CEILING (CUT OF GROUND EFFECT)
IN FEET
- XX 21 - MAXIMUM VELOCITY IN KNOTS
- 26 - LENGTH OF THE TAILBOOM IN FEET
- 21 - MAXIMUM VELOCITY IN KNOTS
- 27 - OPERATING WEIGHT IN POUNDS
- 21 - MAXIMUM VELOCITY IN KNOTS
- 28 - LOAD WEIGHT IN POUNDS
- XX 21 - MAXIMUM VELOCITY IN KNOTS
- 29 - FUEL WEIGHT IN POUNDS
- 21 - MAXIMUM VELOCITY IN KNOTS
- 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 26

Maximum Range Pairings

- 22 - MAXIMUM RANGE IN NAUTICAL MILES
- 23 - RATE OF CLIMB IN FEET PER MINUTE,
MAXIMUM CONTINUOUS POWER
- XX 22 - MAXIMUM RANGE IN NAUTICAL MILES
- 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- XX 22 - MAXIMUM RANGE IN NAUTICAL MILES
- 25 - HOVER CEILING (CUT OF GROUND EFFECT)
IN FEET
- XX 22 - MAXIMUM RANGE IN NAUTICAL MILES
- 26 - LENGTH OF THE TAILBOOM IN FEET
- 22 - MAXIMUM RANGE IN NAUTICAL MILES
- 27 - OPERATING WEIGHT IN POUNDS
- 22 - MAXIMUM RANGE IN NAUTICAL MILES
- 28 - LOAD WEIGHT IN POUNDS
- 22 - MAXIMUM RANGE IN NAUTICAL MILES
- 29 - FUEL WEIGHT IN POUNDS
- 22 - MAXIMUM RANGE IN NAUTICAL MILES
- 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 27

Rate of Climb Pairings

- 23 - RATE OF CLIMB IN FEET PER MINUTE
MAXIMUM CONTINUOUS POWER
- 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 23 - RATE OF CLIMB IN FEET PER MINUTE
MAXIMUM CONTINUOUS POWER
- 25 - HOVER CEILING (CUT OF GROUND EFFECT)
IN FEET
- 23 - RATE OF CLIMB IN FEET PER MINUTE
MAXIMUM CONTINUOUS POWER
- 26 - LENGTH OF THE TAILBOOM IN FEET
- 23 - RATE OF CLIMB IN FEET PER MINUTE
MAXIMUM CONTINUOUS POWER
- 27 - OPERATING WEIGHT IN POUNDS
- 23 - RATE OF CLIMB IN FEET PER MINUTE
MAXIMUM CONTINUOUS POWER
- 28 - LOAD WEIGHT IN POUNDS
- 23 - RATE OF CLIMB IN FEET PER MINUTE
MAXIMUM CONTINUOUS POWER
- 29 - FUEL WEIGHT IN POUNDS
- 23 - RATE OF CLIMB IN FEET PER MINUTE
MAXIMUM CONTINUOUS POWER
- 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 28

Hover Ceiling (IGE) Pairings

- 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 25 - HOVER CEILING (CUT OF GROUND EFFECT)
IN FEET
- XX 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 26 - LENGTH OF THE TAILBOOM IN FEET
- 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 27 - OPERATING WEIGHT IN POUNDS
- 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 28 - LOAD WEIGHT IN POUNDS
- XX 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 29 - FUEL WEIGHT IN POUNDS
- 24 - HOVER CEILING (IN GROUND EFFECT)
IN FEET
- 30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 29
Hover Ceiling (OGE) Pairings

XX	25	- HOVER CEILING (CUT OF GROUND EFFECT) IN FEET
	26	- LENGTH OF THE TAILBOOM IN FEET
	25	- HOVER CEILING (CUT OF GROUND EFFECT) IN FEET
	27	- OPERATING WEIGHT IN POUNDS
	25	- HOVER CEILING (CUT OF GROUND EFFECT) IN FEET
	28	- LOAD WEIGHT IN POUNDS
XX	25	- HOVER CEILING (CUT OF GROUND EFFECT) IN FEET
	29	- FUEL WEIGHT IN POUNDS
	25	- HOVER CEILING (CUT OF GROUND EFFECT) IN FEET
	30	- MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 30
Length of Tail Pairings

	26	- LENGTH OF THE TAILBOOM IN FEET
	27	- OPERATING WEIGHT IN POUNDS
	26	- LENGTH OF THE TAILBOOM IN FEET
	28	- LOAD WEIGHT IN POUNDS
XX	26	- LENGTH OF THE TAILBOOM IN FEET
	29	- FUEL WEIGHT IN POUNDS
	26	- LENGTH OF THE TAILBOOM IN FEET
	30	- MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 31
Operating Weight Pairings

27 - OPERATING WEIGHT IN POUNDS
28 - LOAD WEIGHT IN POUNDS
27 - OPERATING WEIGHT IN POUNDS
29 - FUEL WEIGHT IN POUNDS
27 - OPERATING WEIGHT IN POUNDS
30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 32
Load Weight Pairings

28 - LOAD WEIGHT IN POUNDS
29 - FUEL WEIGHT IN POUNDS
28 - LOAD WEIGHT IN POUNDS
30 - MAXIMUM GROSS WEIGHT IN POUNDS

TABLE 33
Fuel Weight Pairings

29 - FUEL WEIGHT IN POUNDS
30 - MAXIMUM GROSS WEIGHT IN POUNDS

APPENDIX C

DATA POINT PLOTS, CURVE FITS, AND CURVE FIT EQUATIONS

Main Rotor Radius Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

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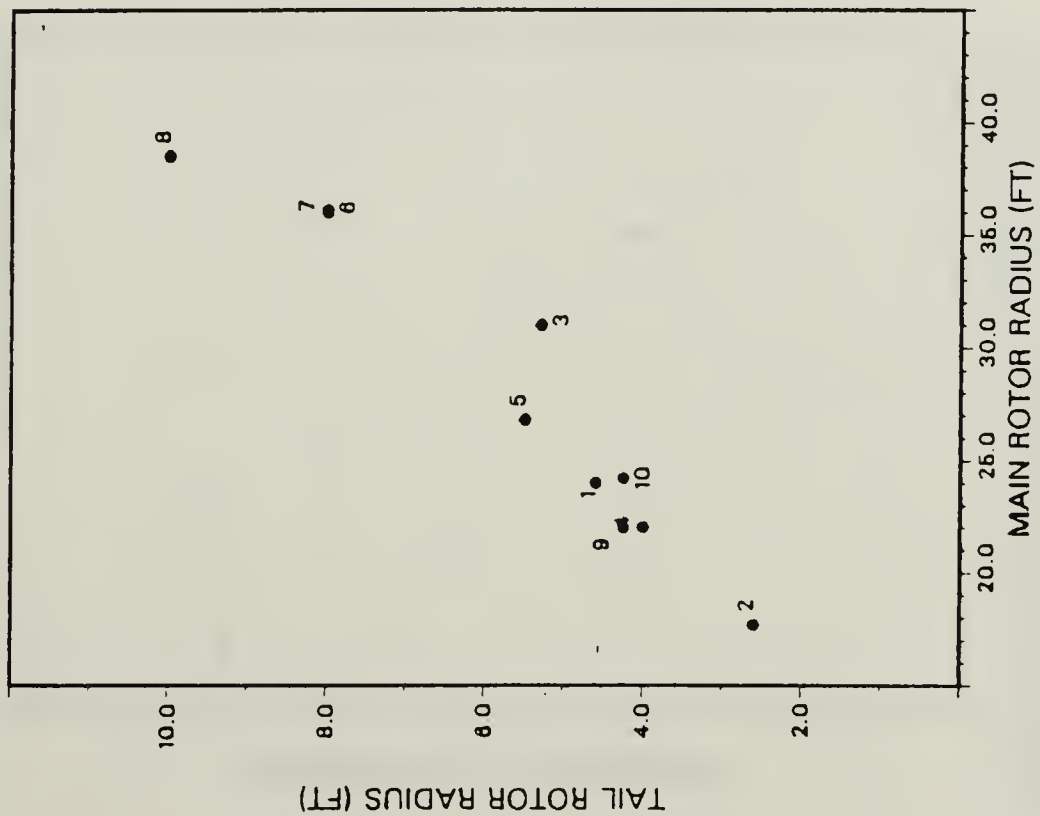


Fig. 1-2a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

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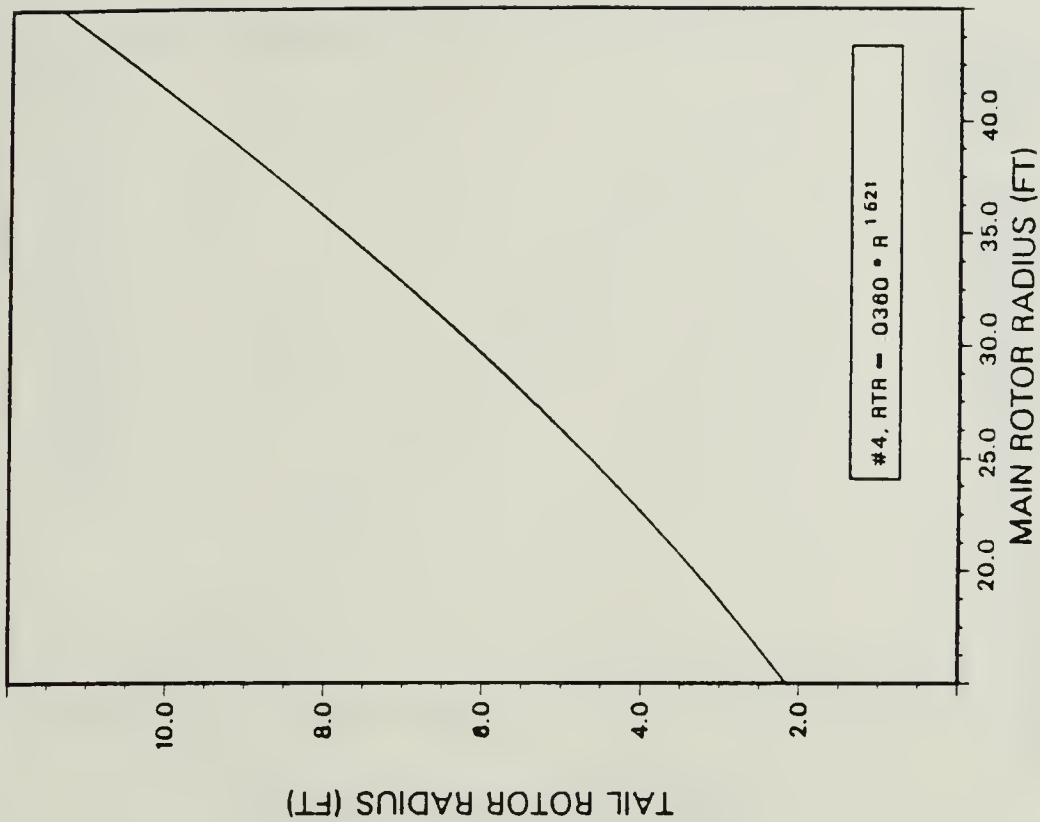


Fig. 1-2b.

Fig. 1-2a and 1-2b.

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- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

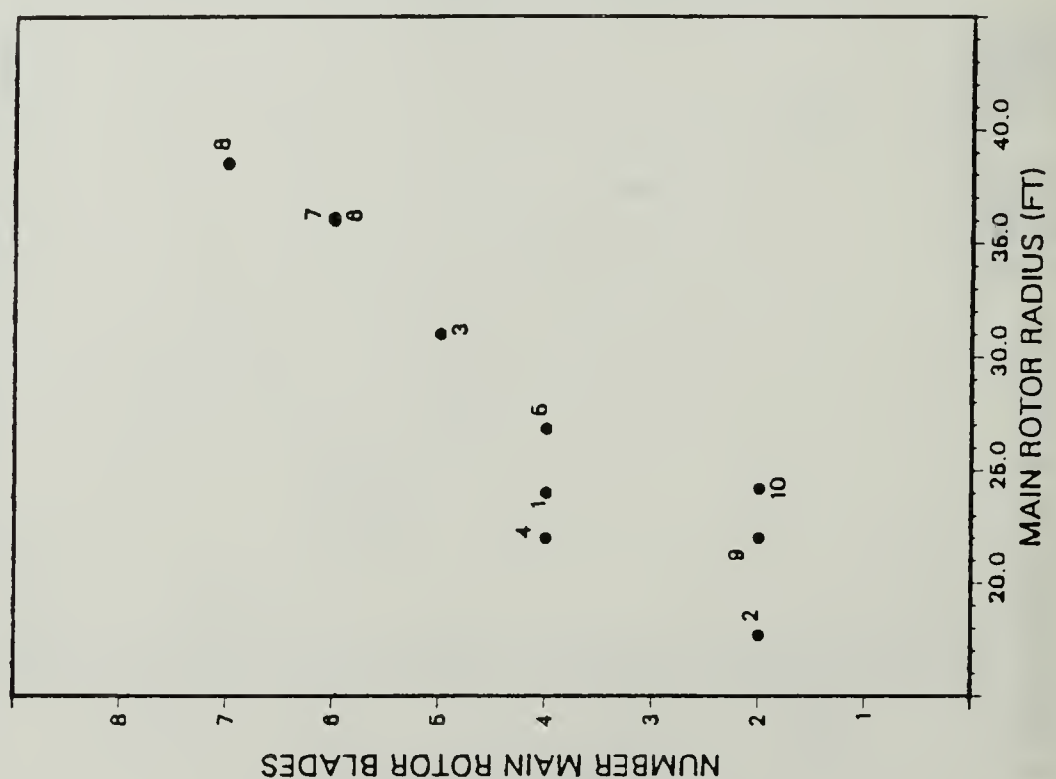


Fig. 1-3a.

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- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

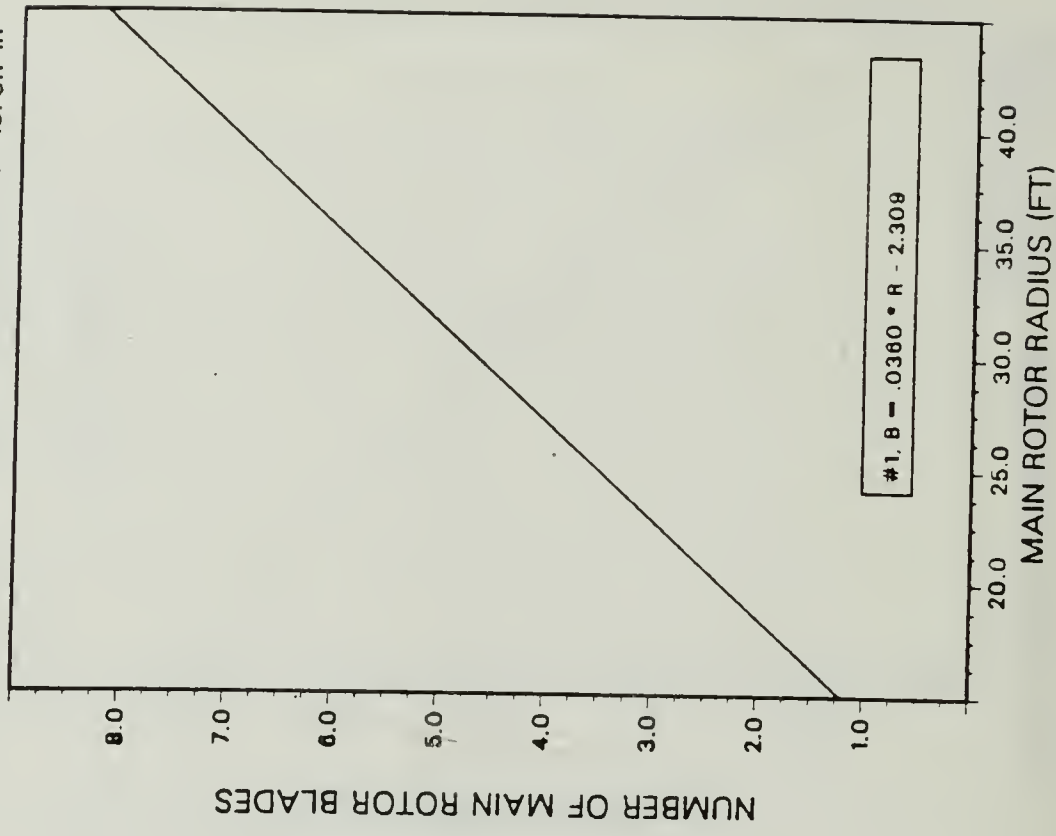


Fig. 1-3b.

Fig. 1-3a and 1-3b.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

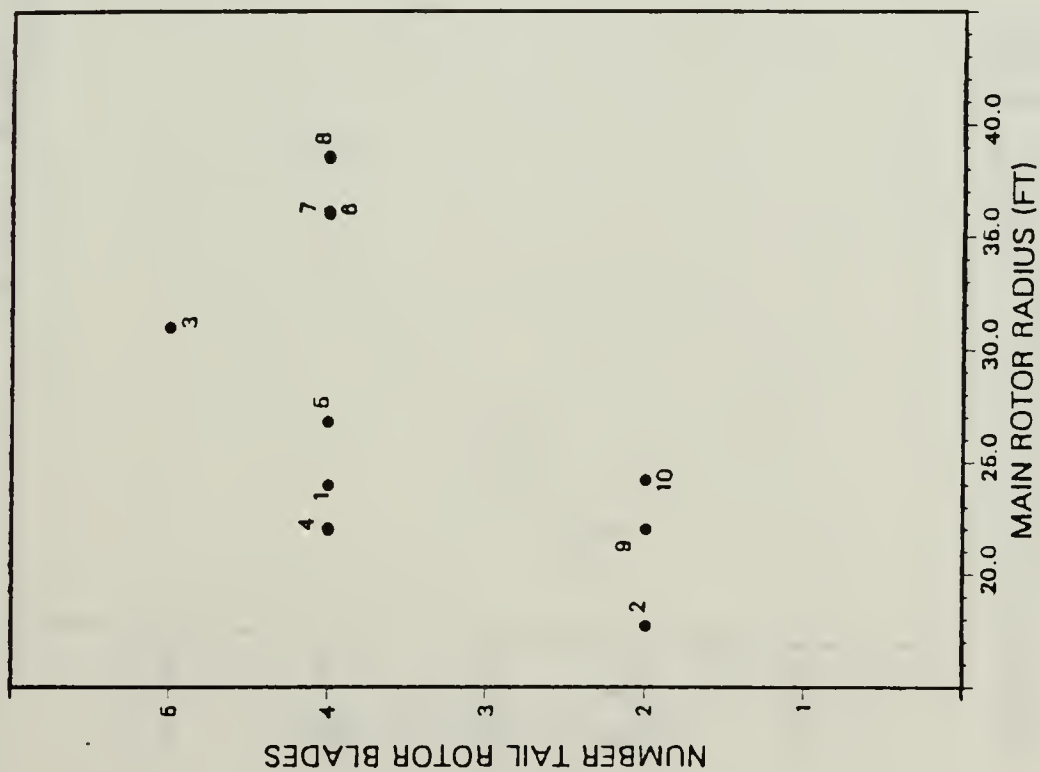


Fig. 1-4.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

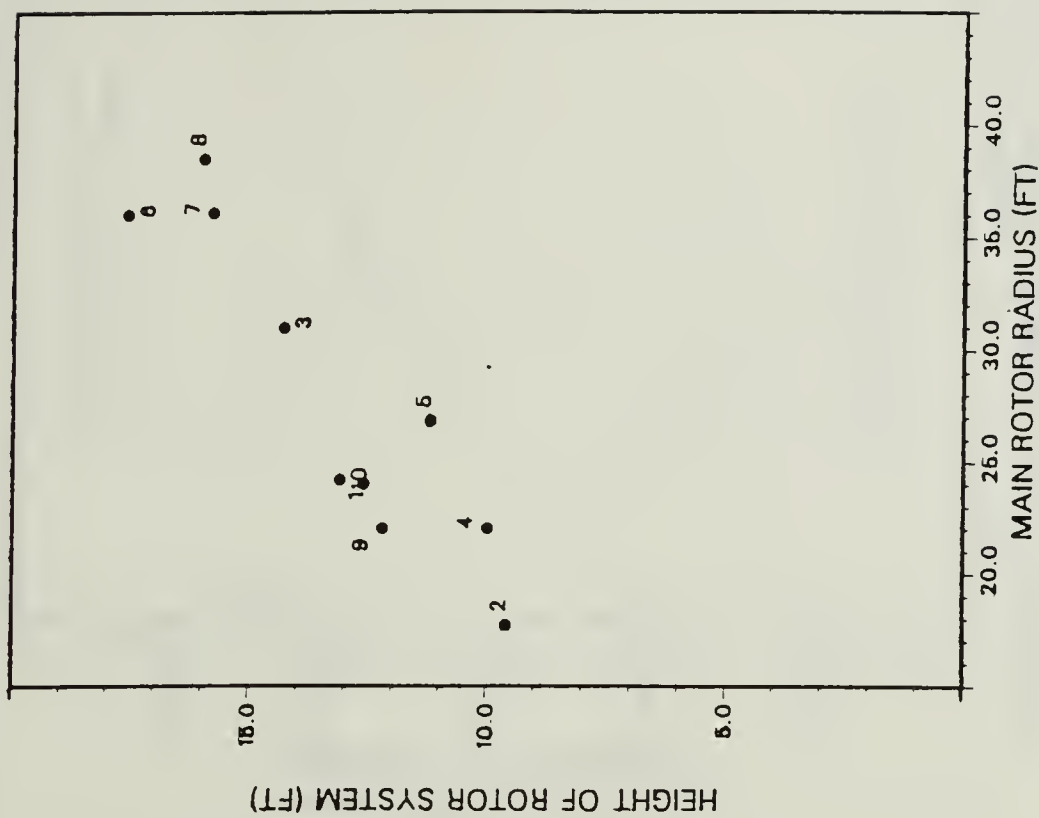


Fig. 1-5.

Fig. 1-4 and 1-5.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

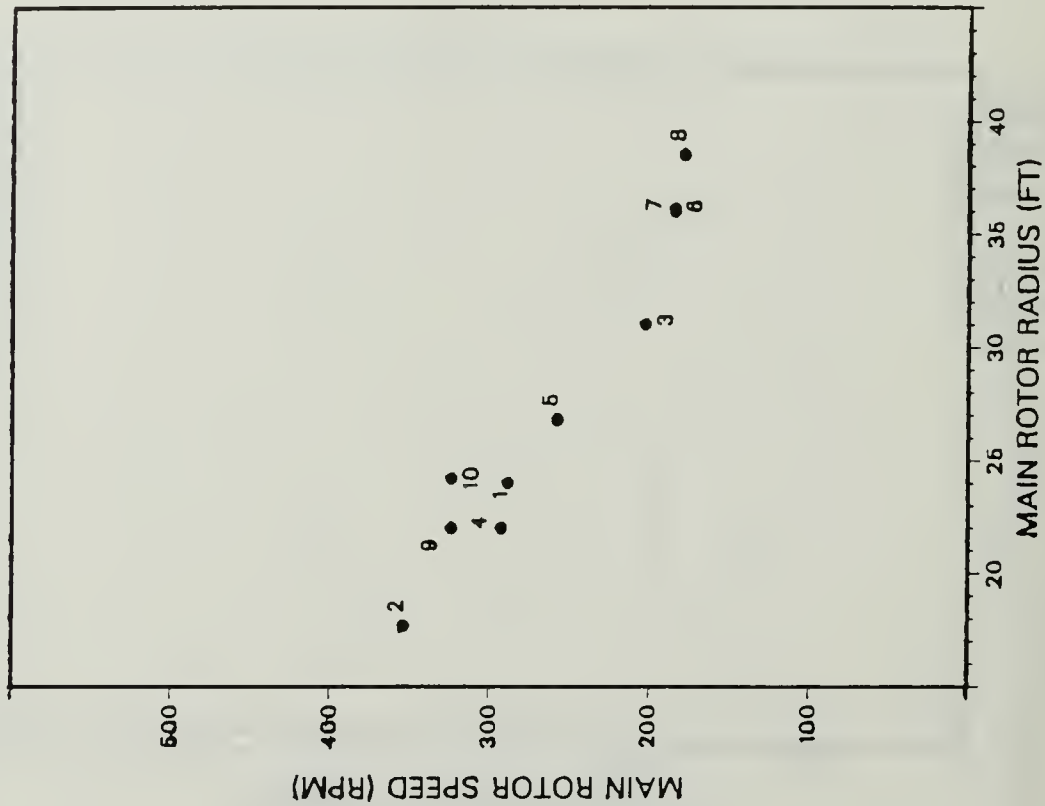


Fig. 1-6a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

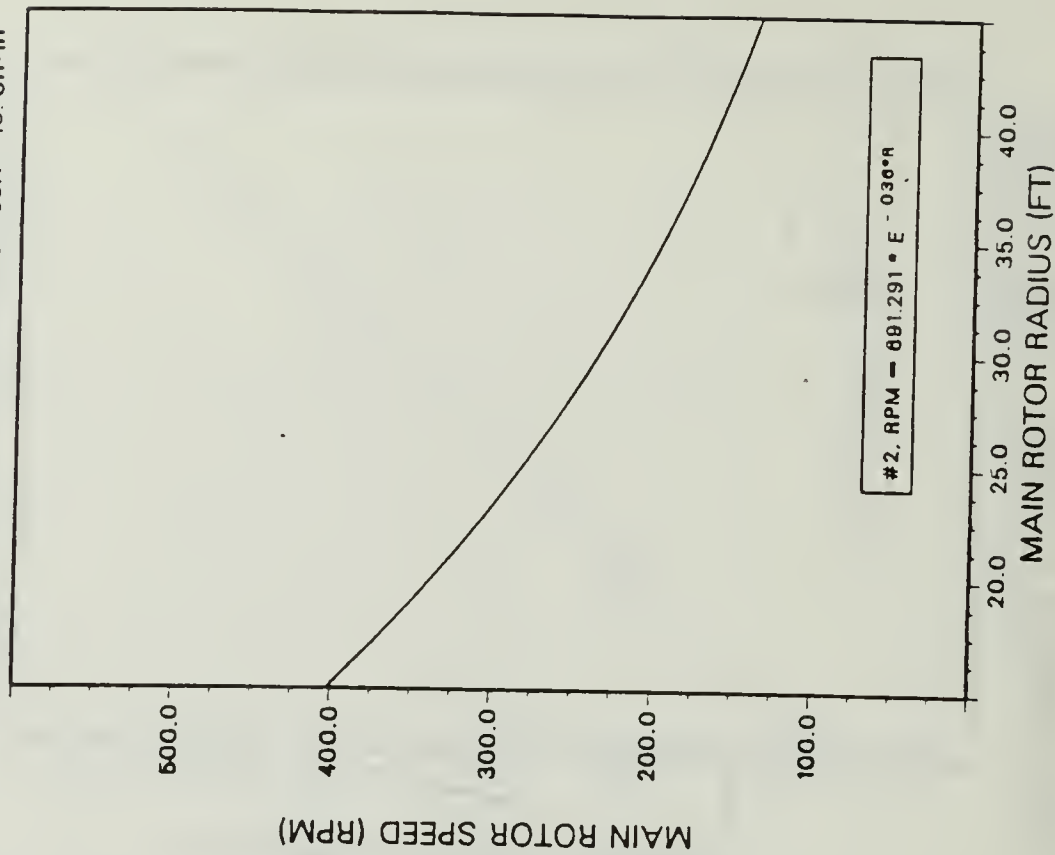


Fig. 1-6b.

Fig. 1-6a and 1-6b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
6. UH-60A
8. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

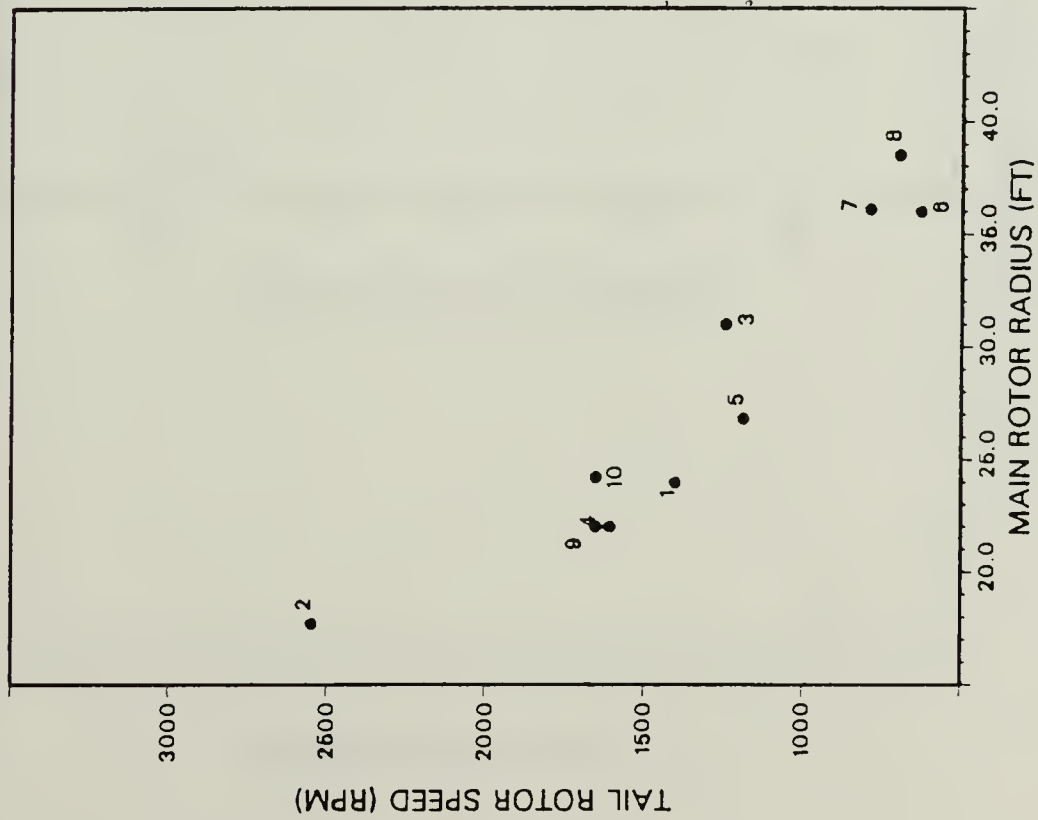


Fig. 1-7a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
6. UH-60A
8. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

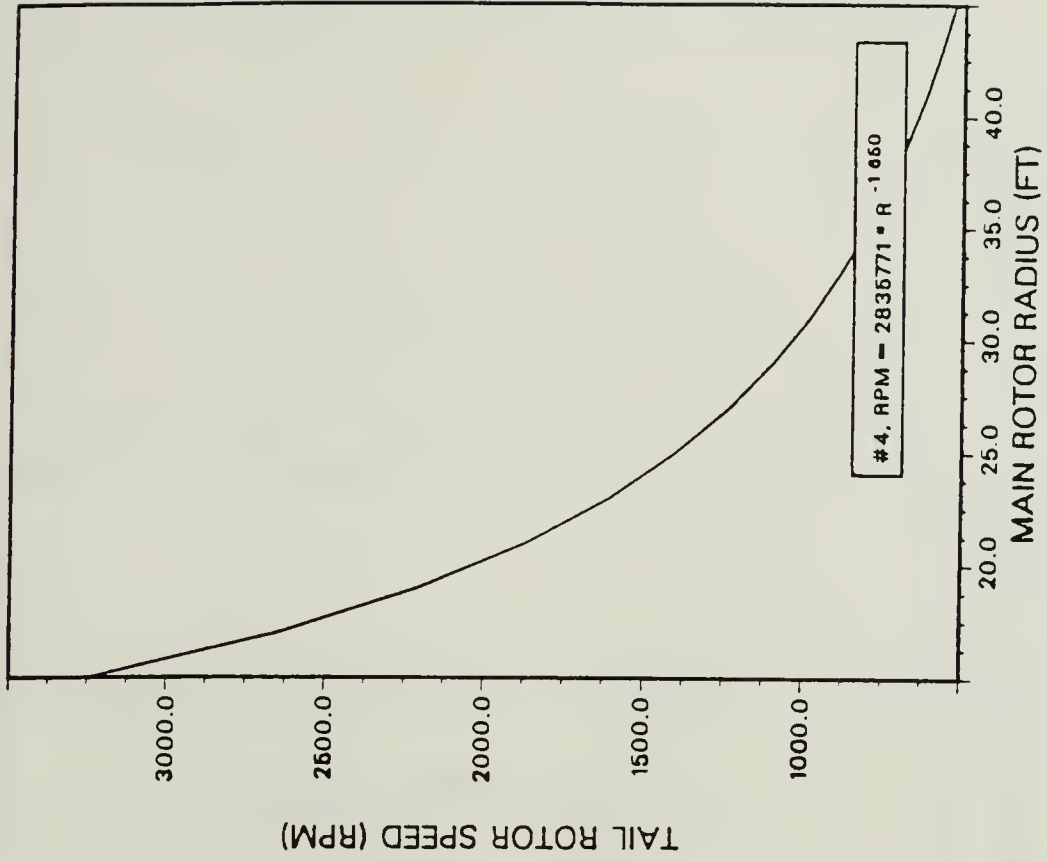


Fig. 1-7b.

Fig. 1-7a and 1-7b.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-78
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

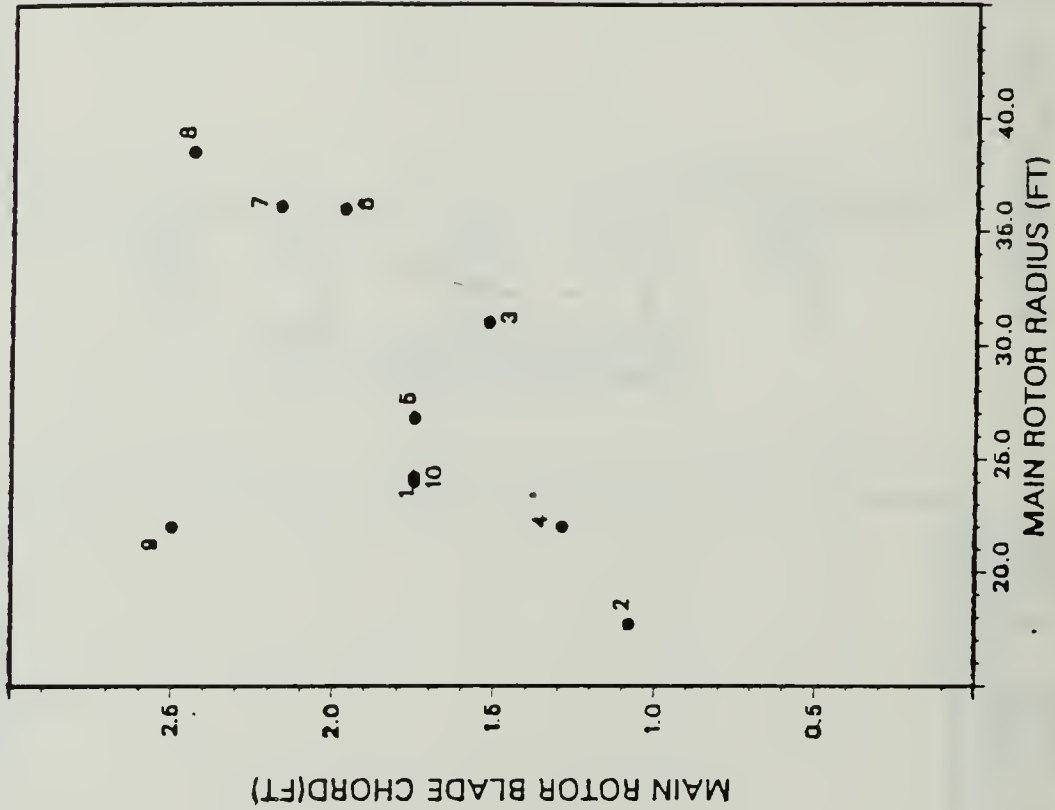


Fig. 1-8.

Fig. 1-8.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

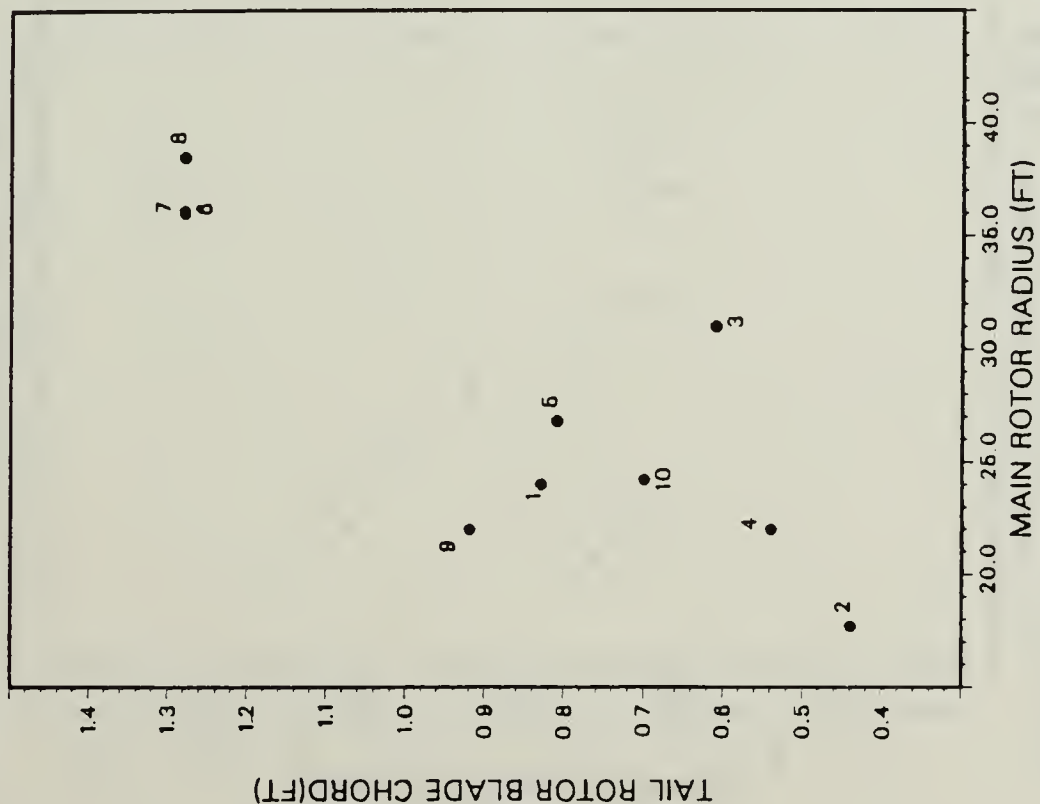


Fig. 1-9a.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

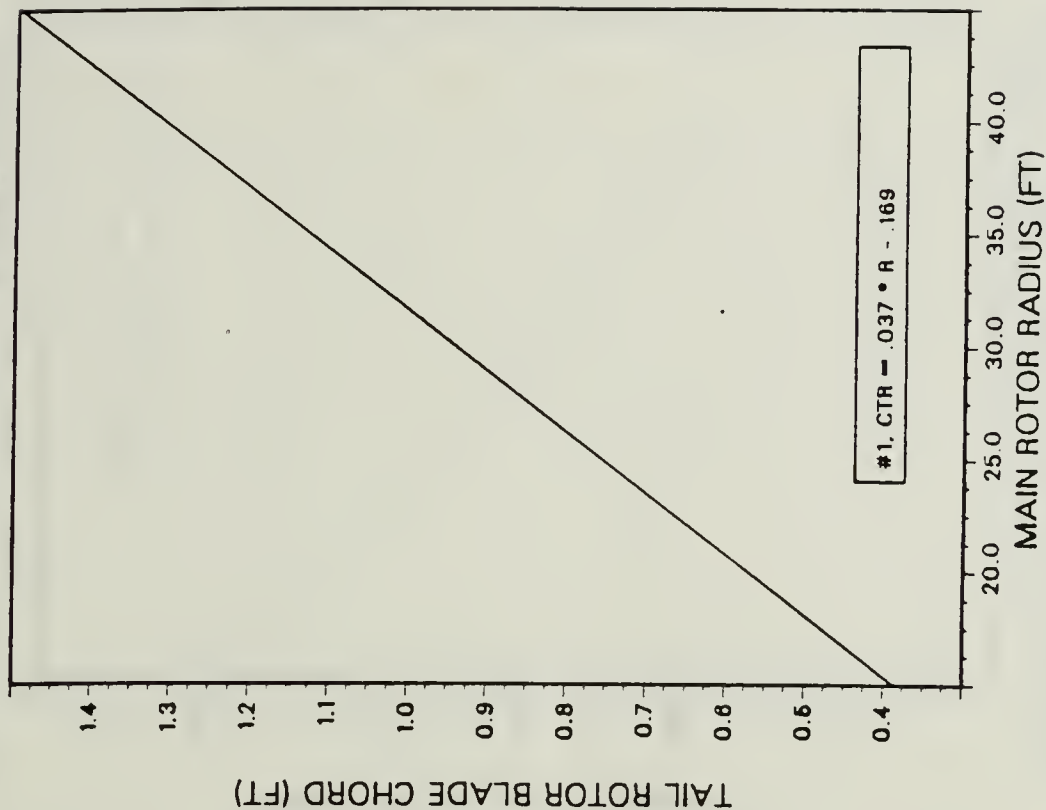


Fig. 1-9b.

Fig. 1-9a and 1-9b.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

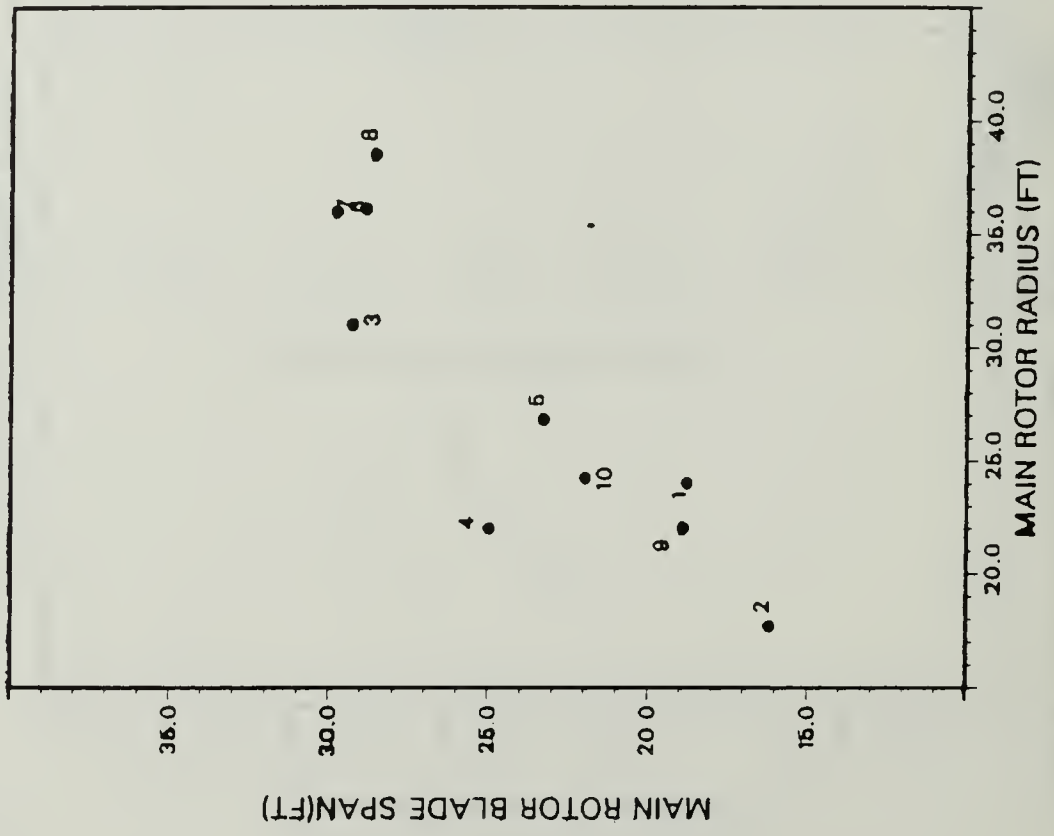


Fig. 1-10a.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

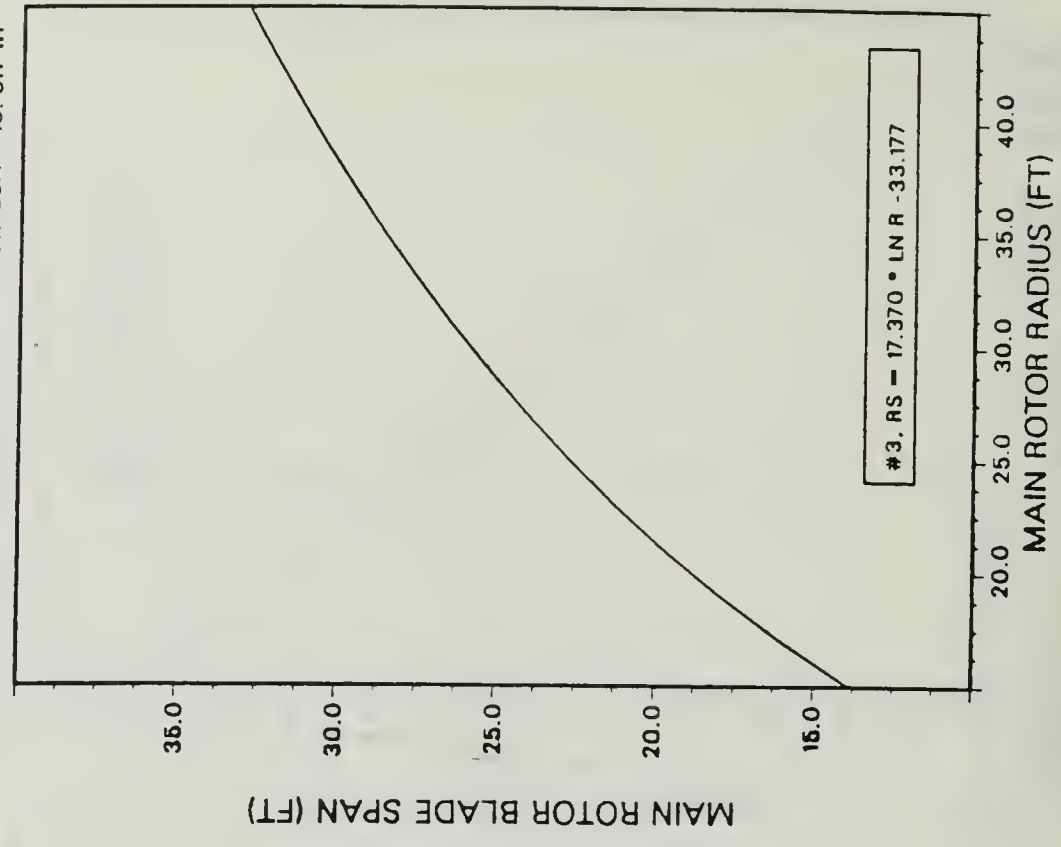


Fig. 1-10b.

Fig. 1-10a and 1-10b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

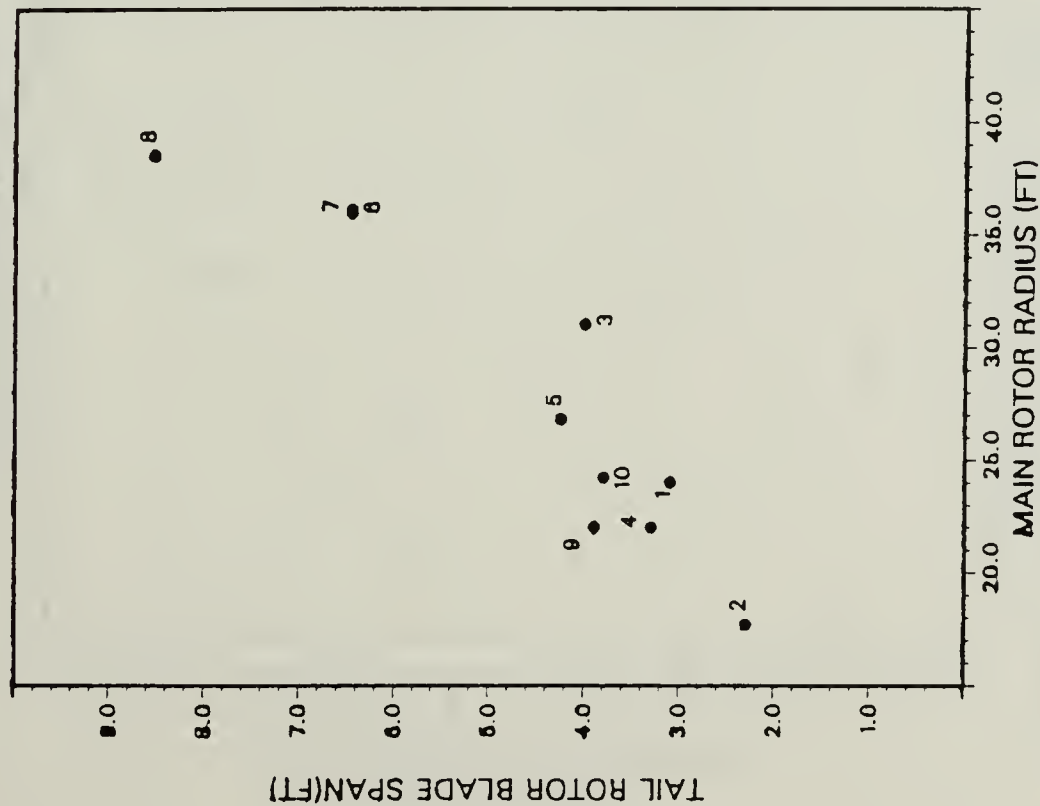


Fig. 1-11a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

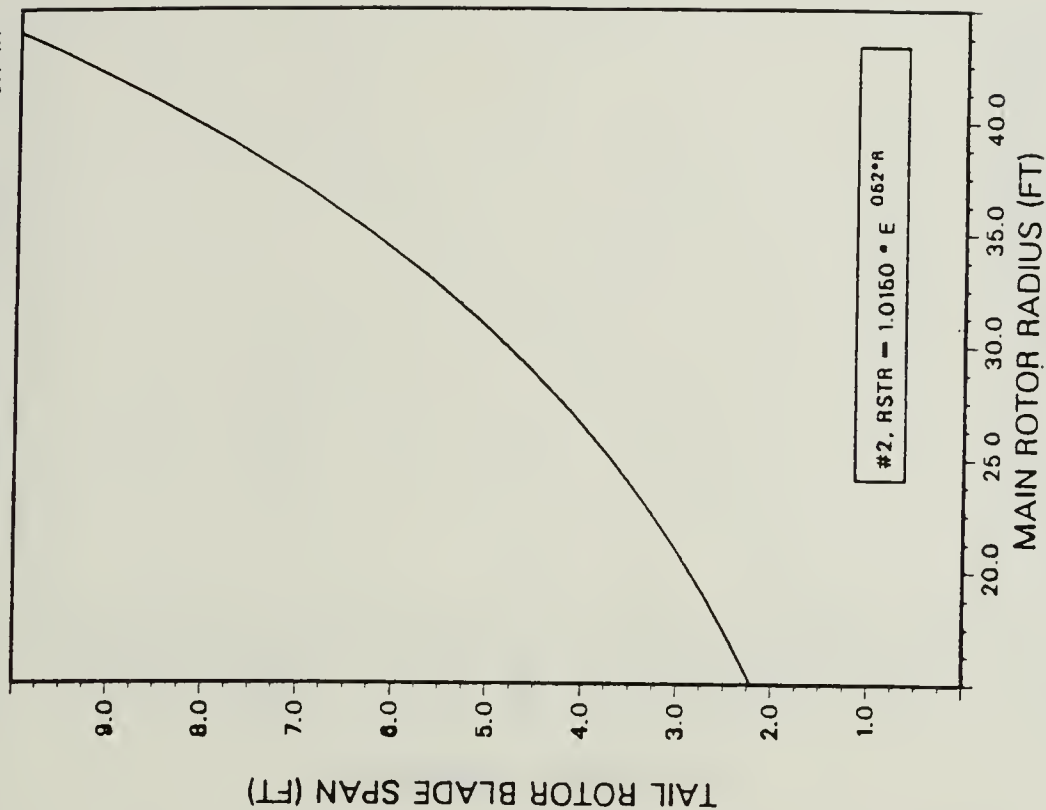


Fig. 1-11b.

Fig. 1-11a and 1-11b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

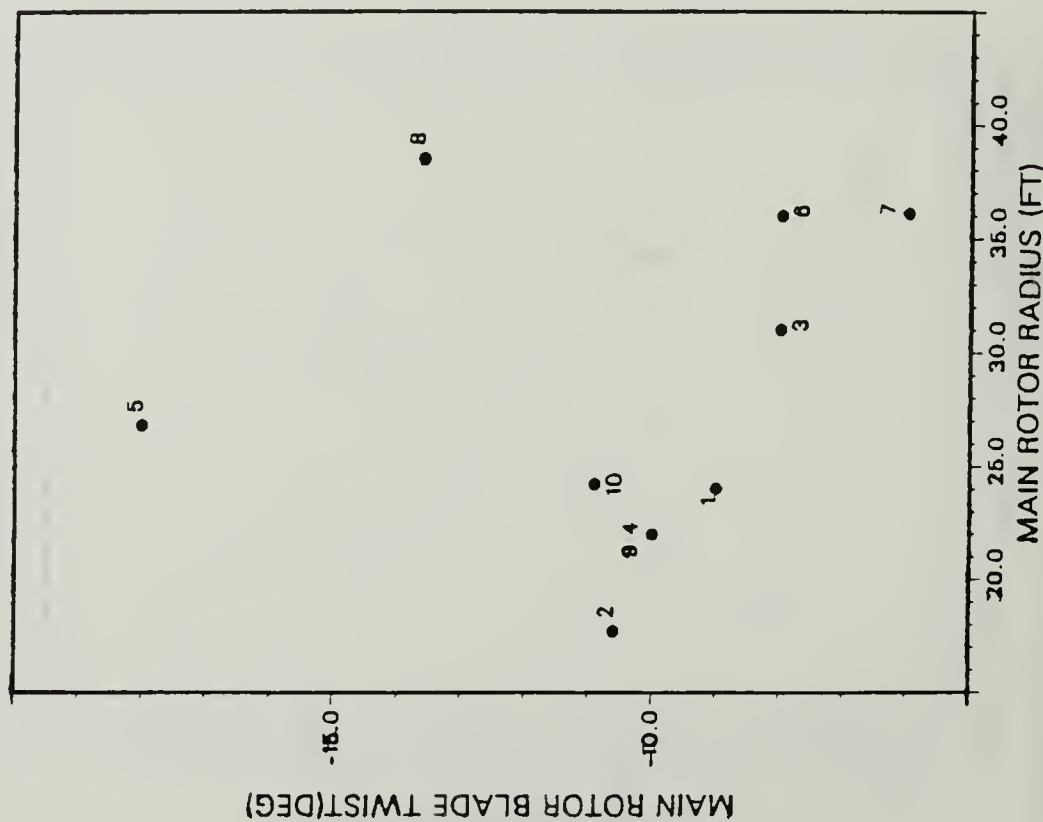


Fig. 1-12.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

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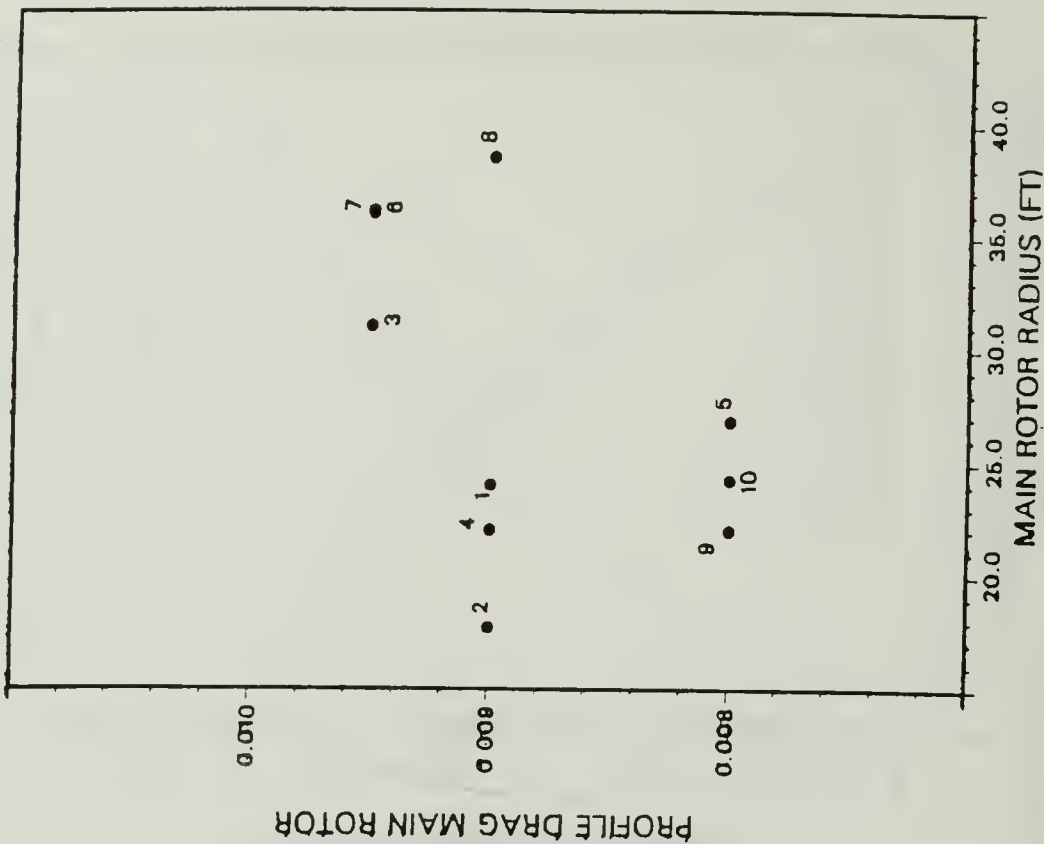


Fig. 1-14.

Fig. 1-12 and 1-14.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

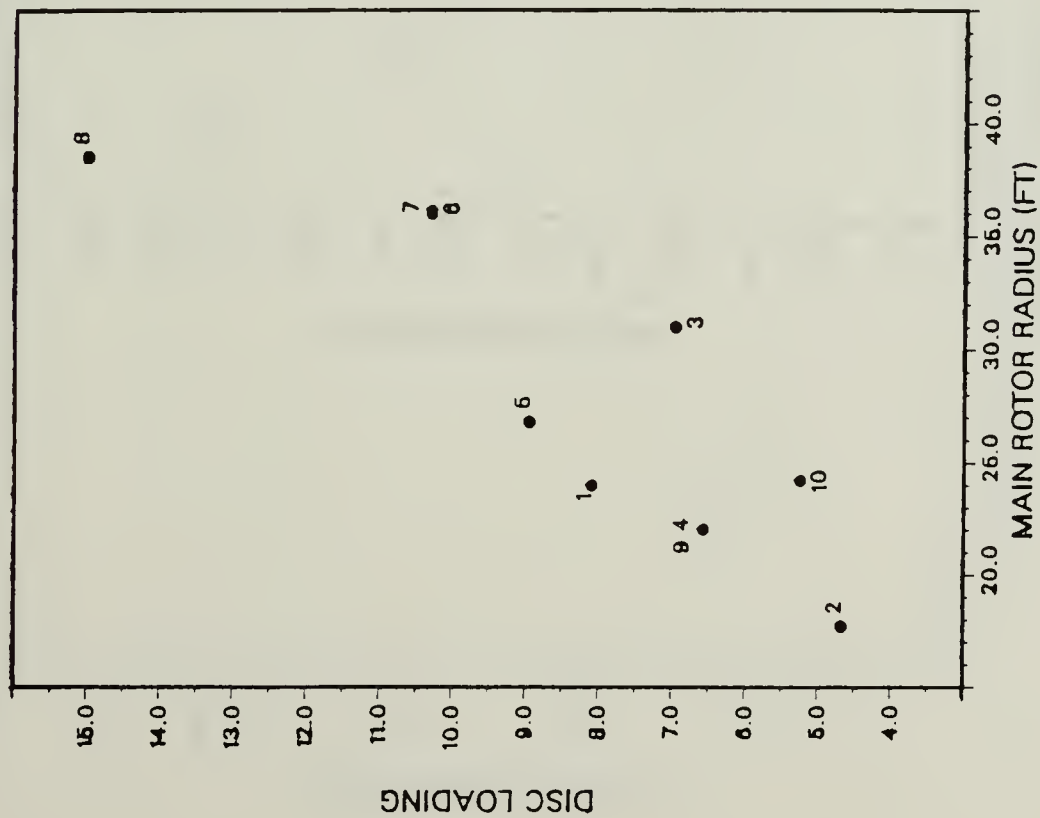


Fig. 1-16a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

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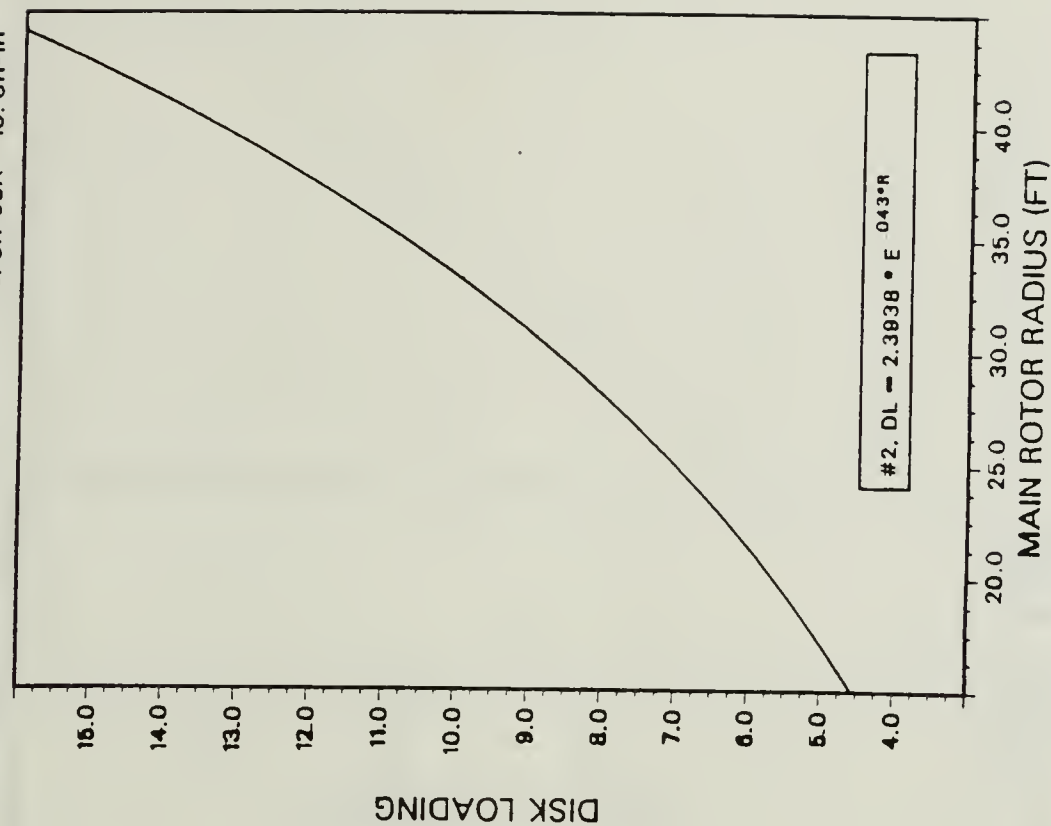


Fig. 1-16b.

Fig. 1-16a and 1-16b.

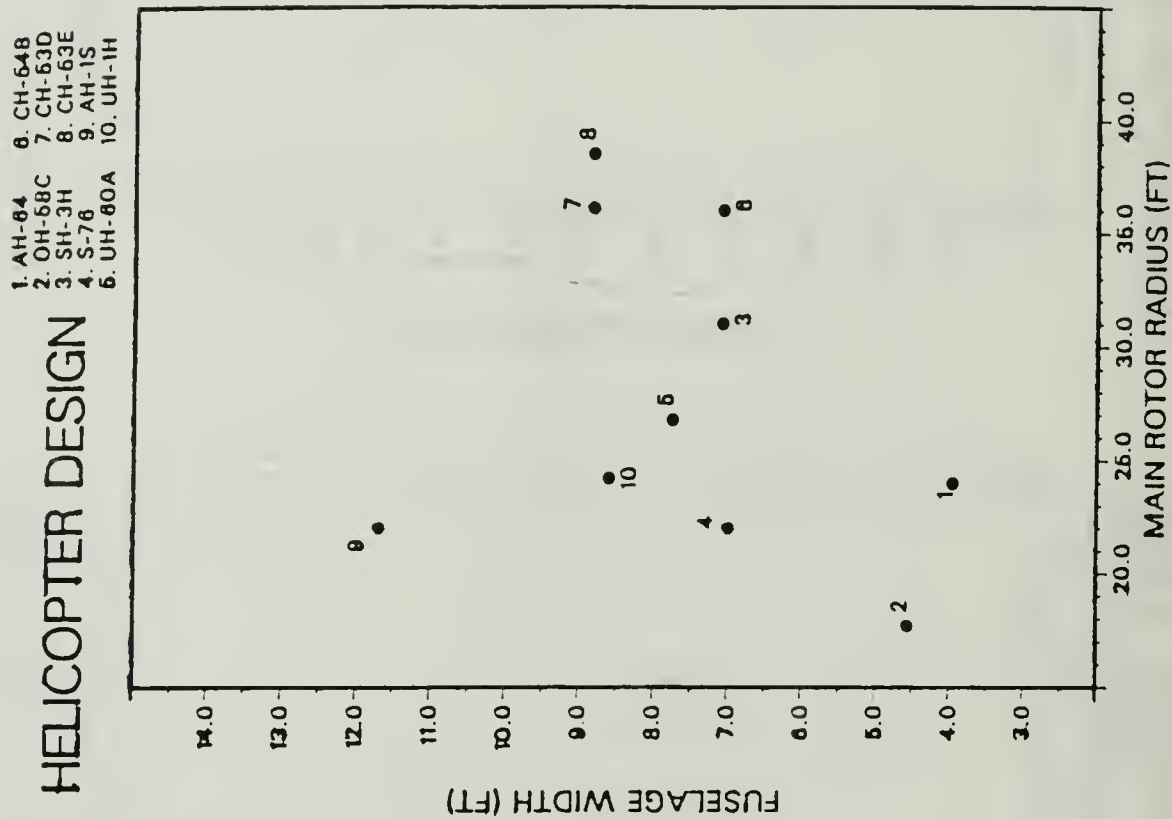


Fig. 1-17.

Fig. 1-17.

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- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

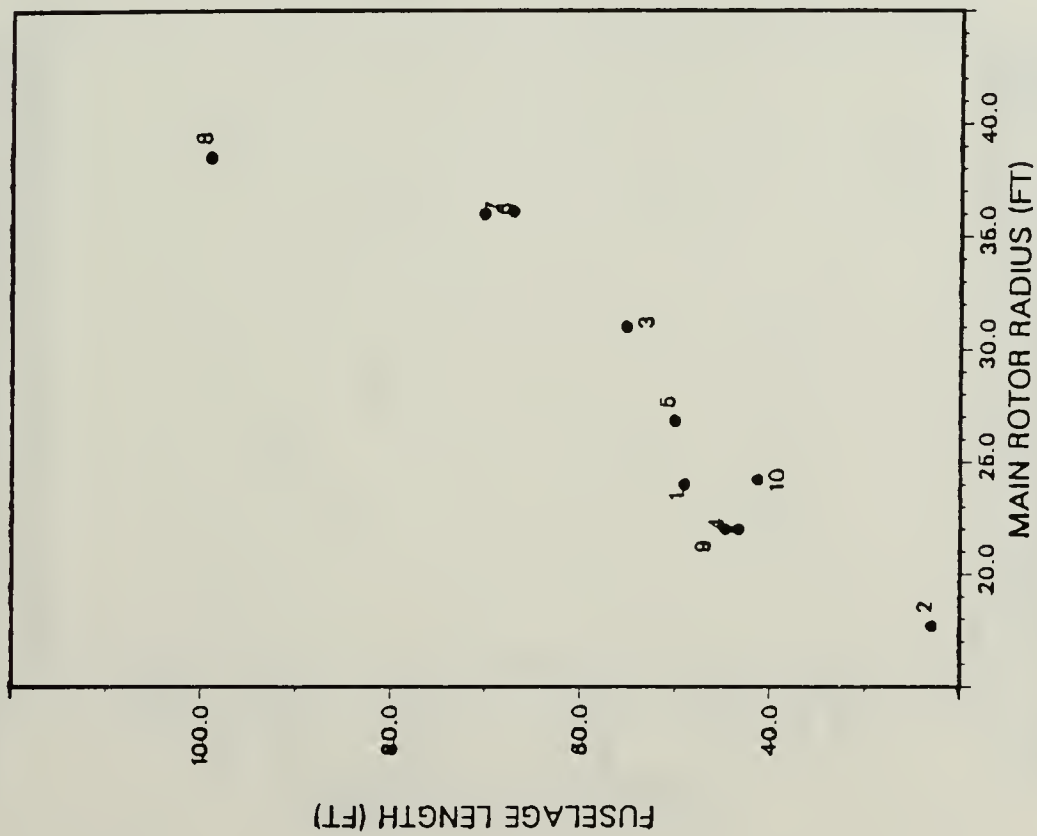


Fig. 1-18a.

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- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

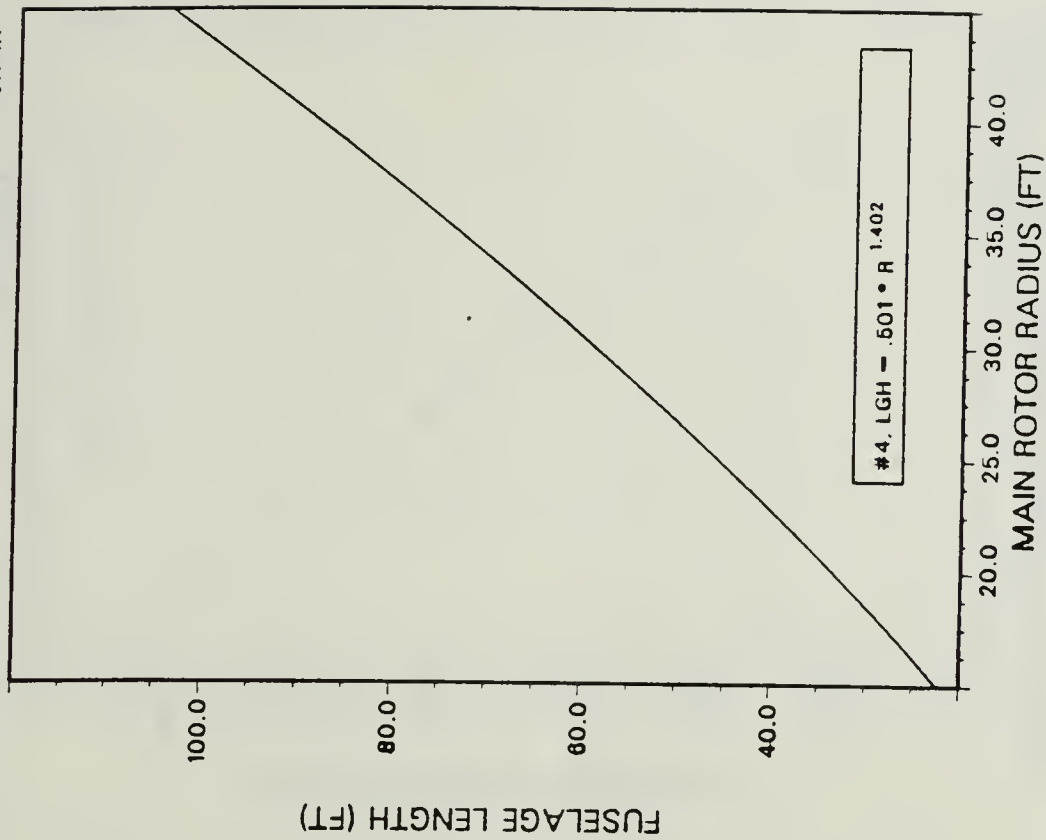


Fig. 1-18b.

Fig. 1-18a and 1-18b.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

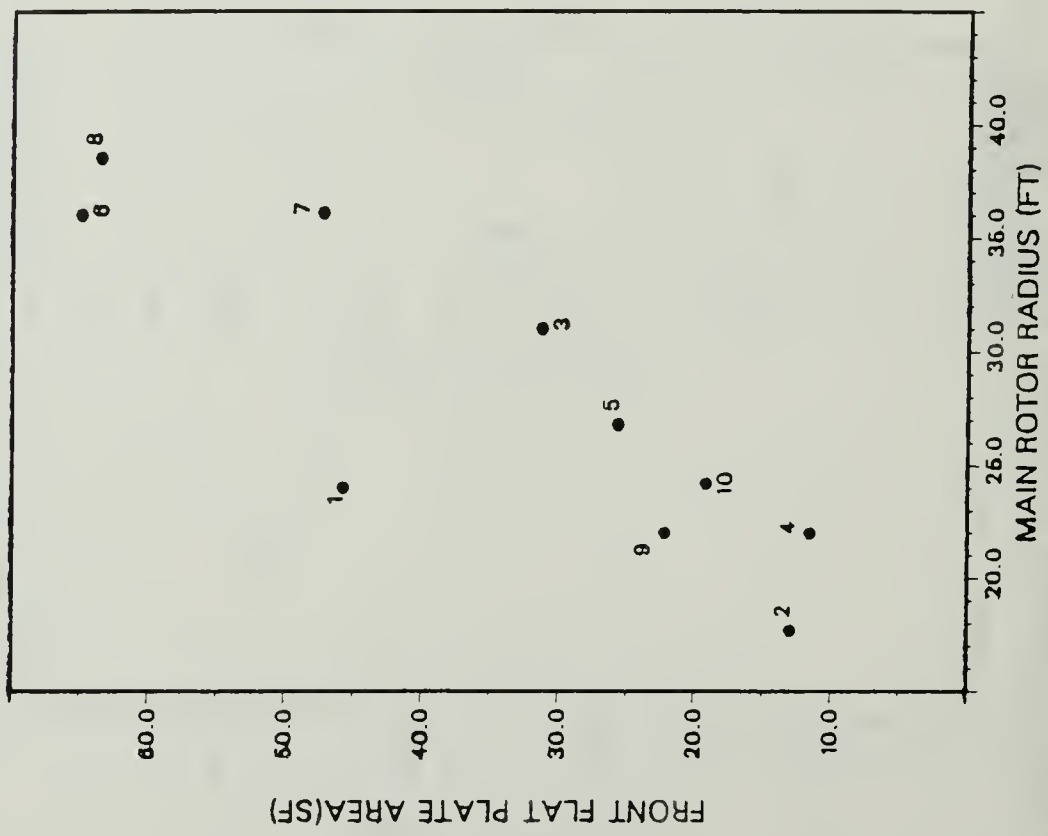


Fig. 1-19a.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

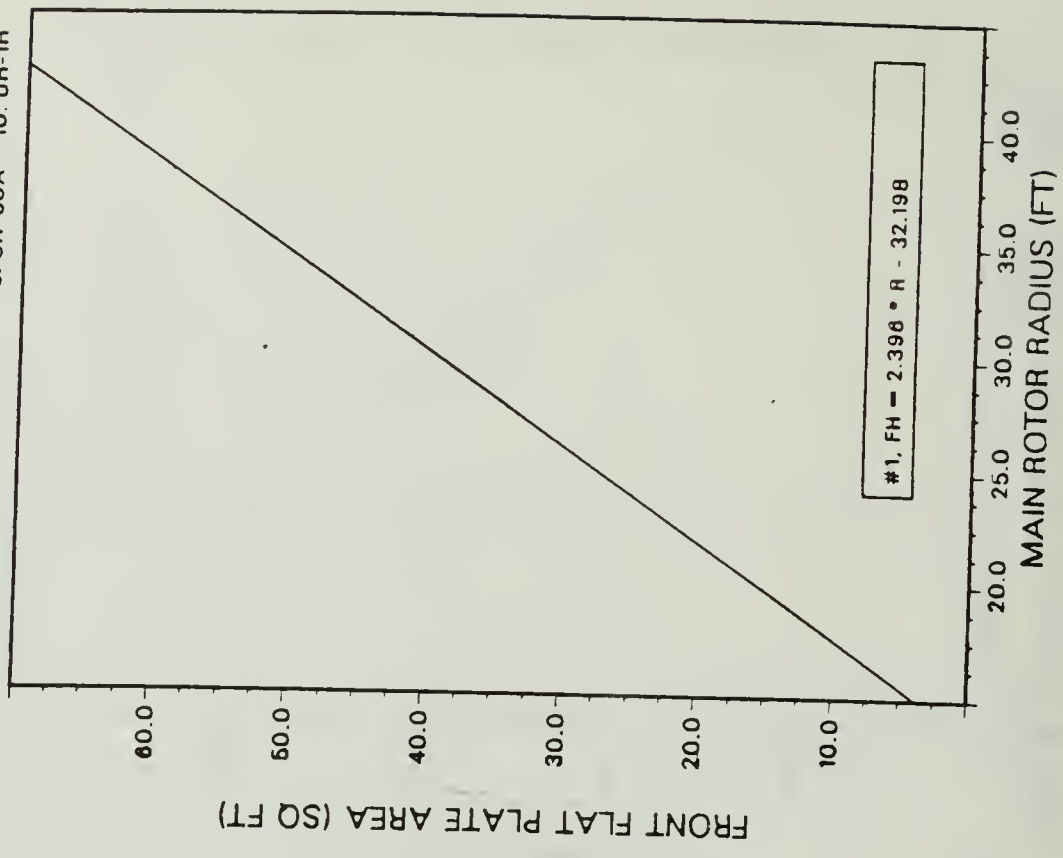


Fig. 1-19b.

Fig. 1-19a and 1-19b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

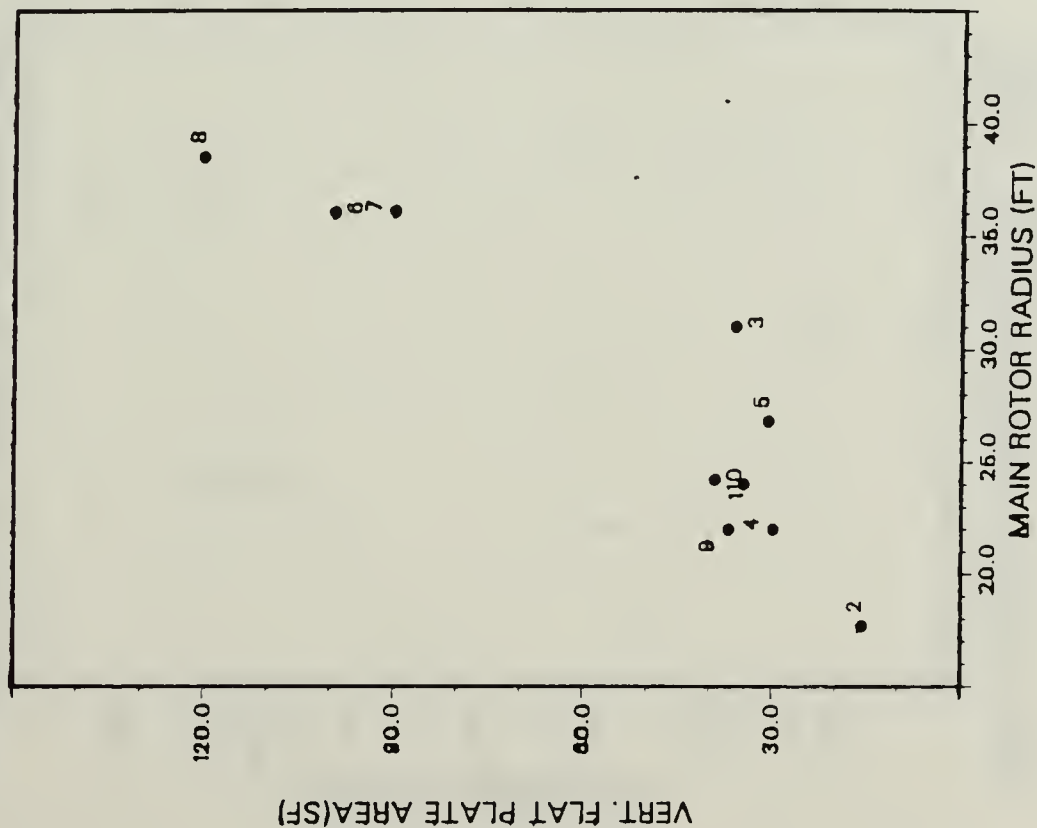


Fig. 1-20.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

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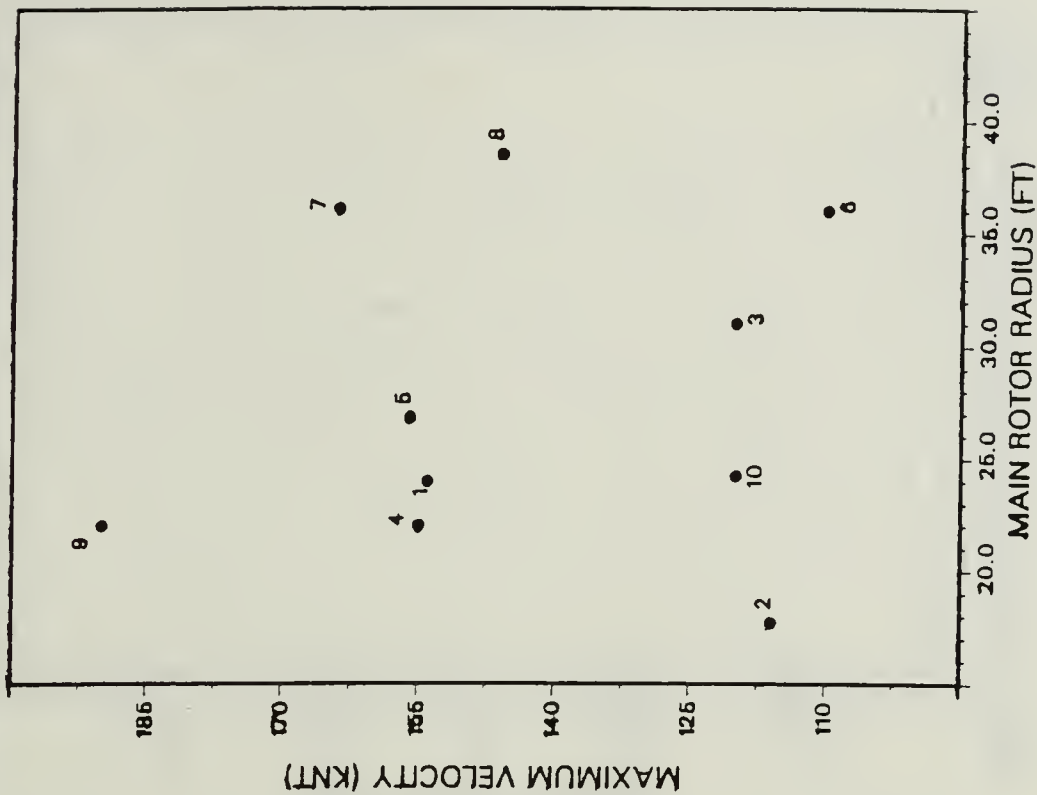


Fig. 1-21.

Fig. 1-20 and 1-21.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

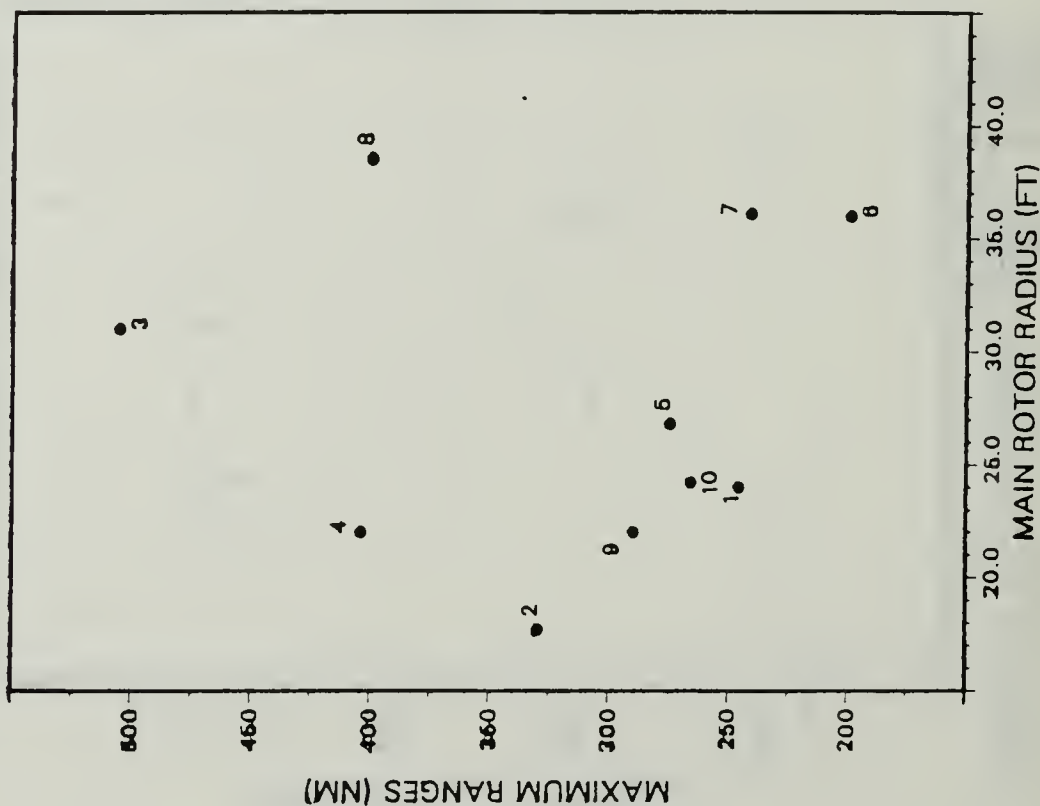


Fig. 1-22.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

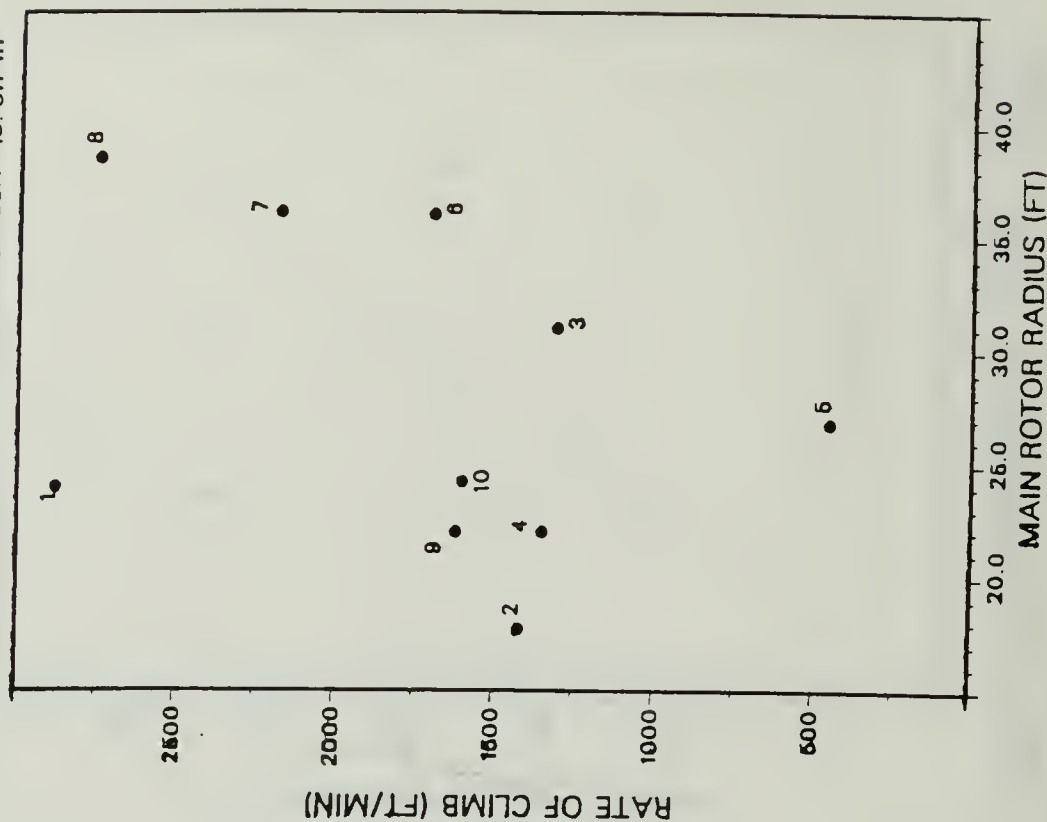


Fig. 1-23.

Fig. 1-22 and 1-23.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

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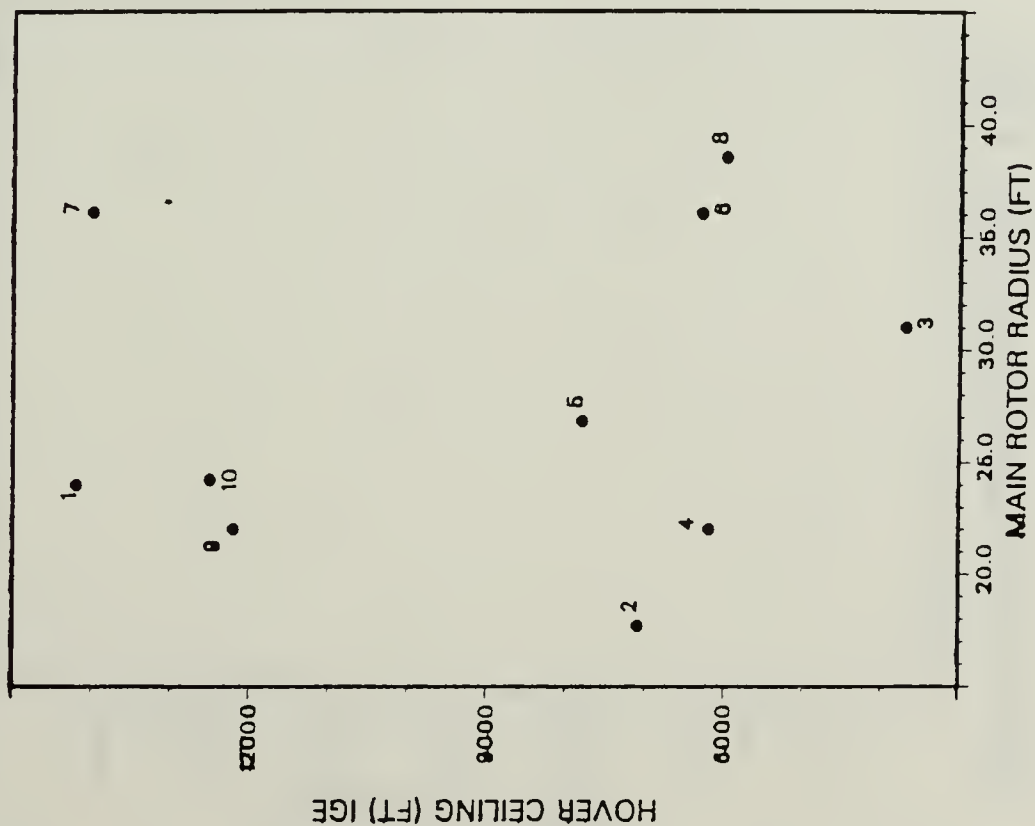


Fig. 1-24.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

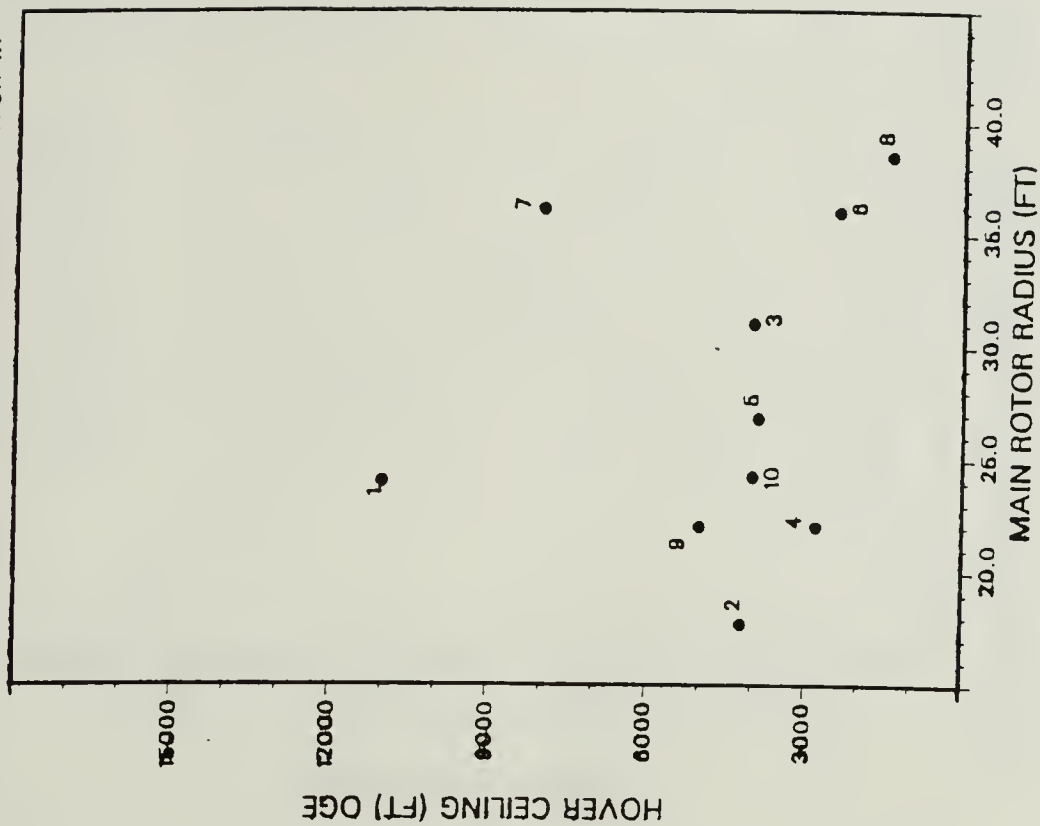


Fig. 1-25.

Fig. 1-24 and 1-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

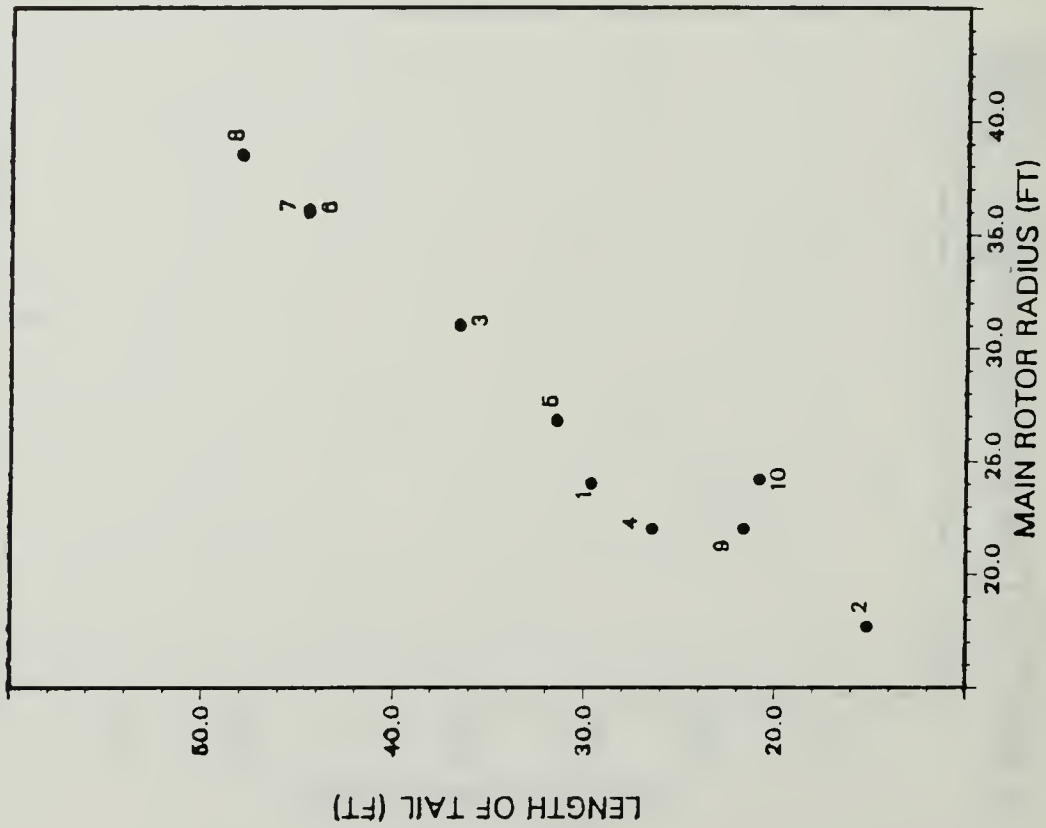


Fig. 1-26a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

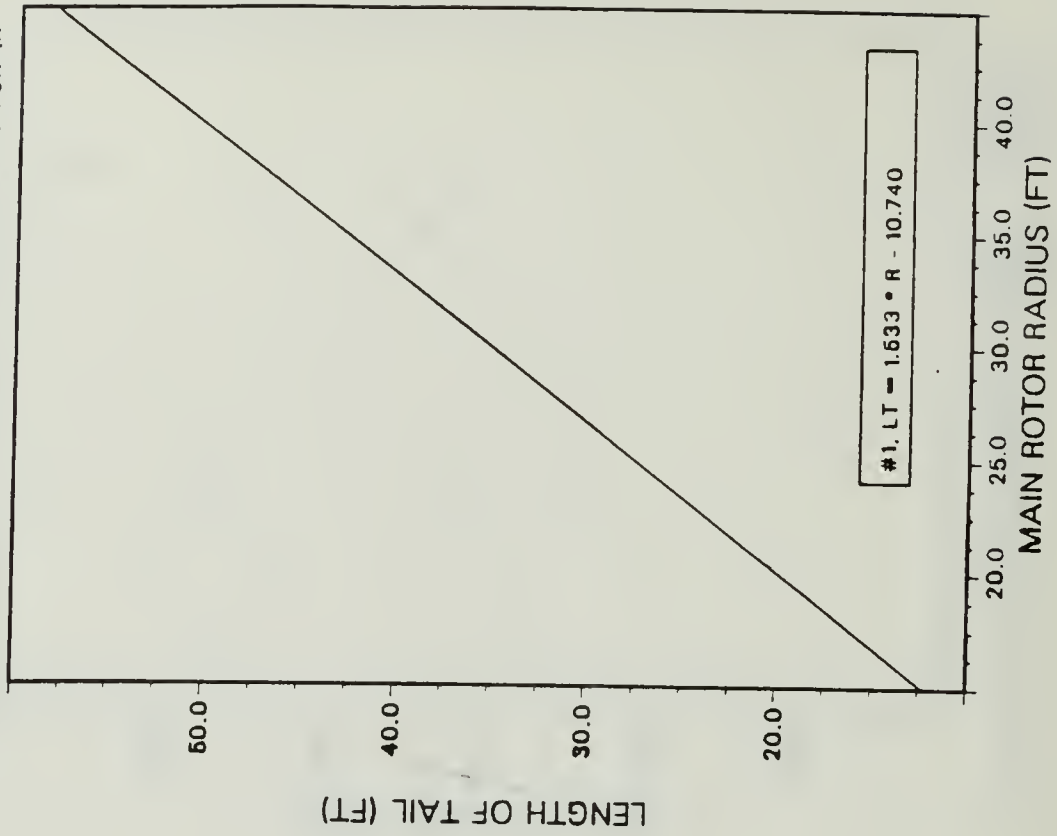


Fig. 1-26b.

Fig. 1-26a and 1-26b.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

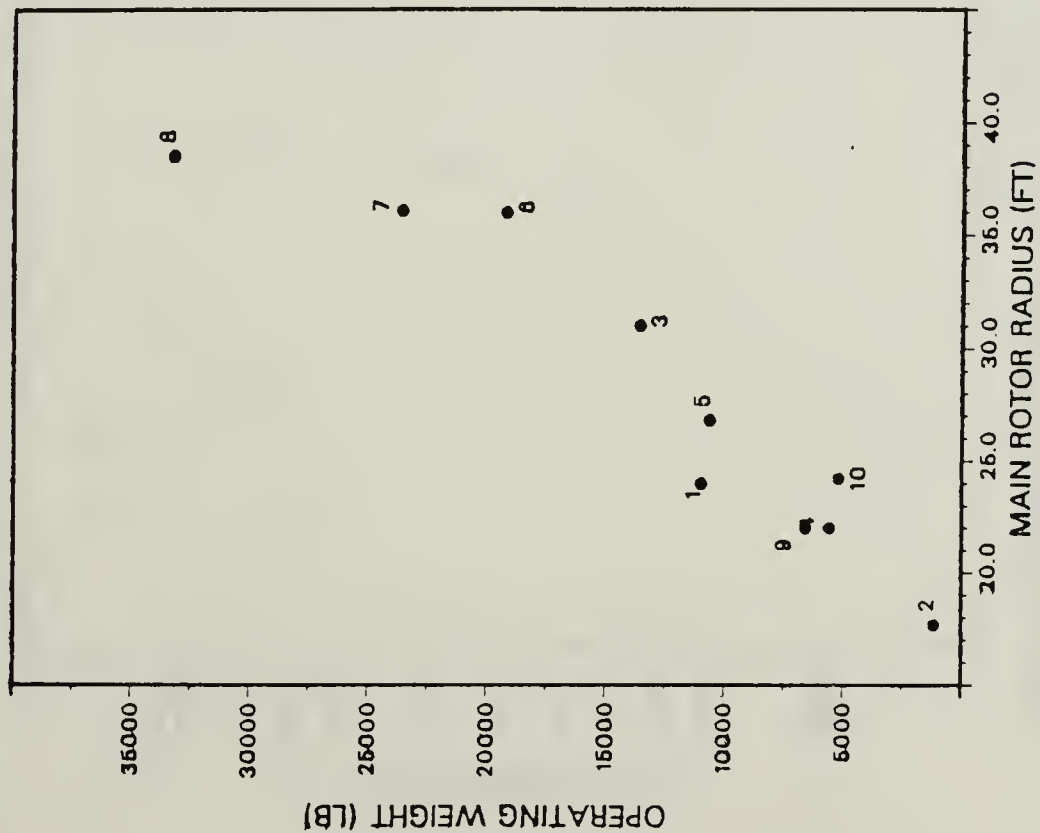


Fig. 1-27a.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

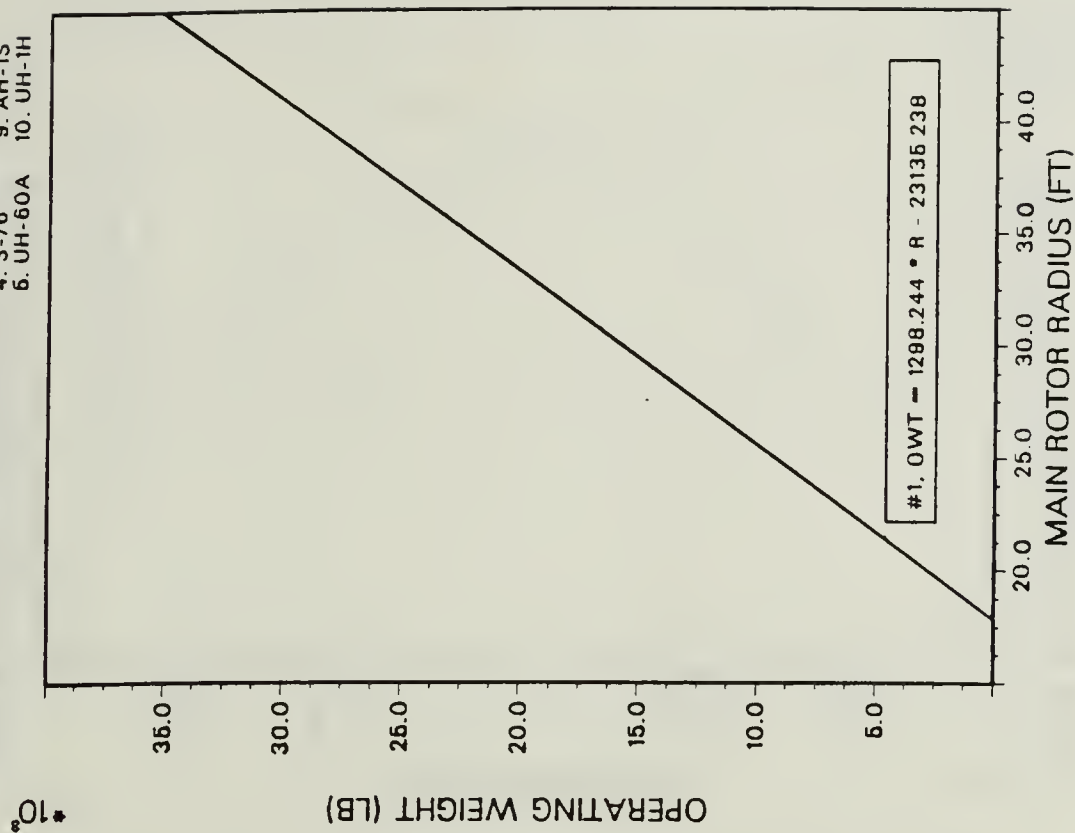


Fig. 1-27b.

Fig. 1-27a and 1-27b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

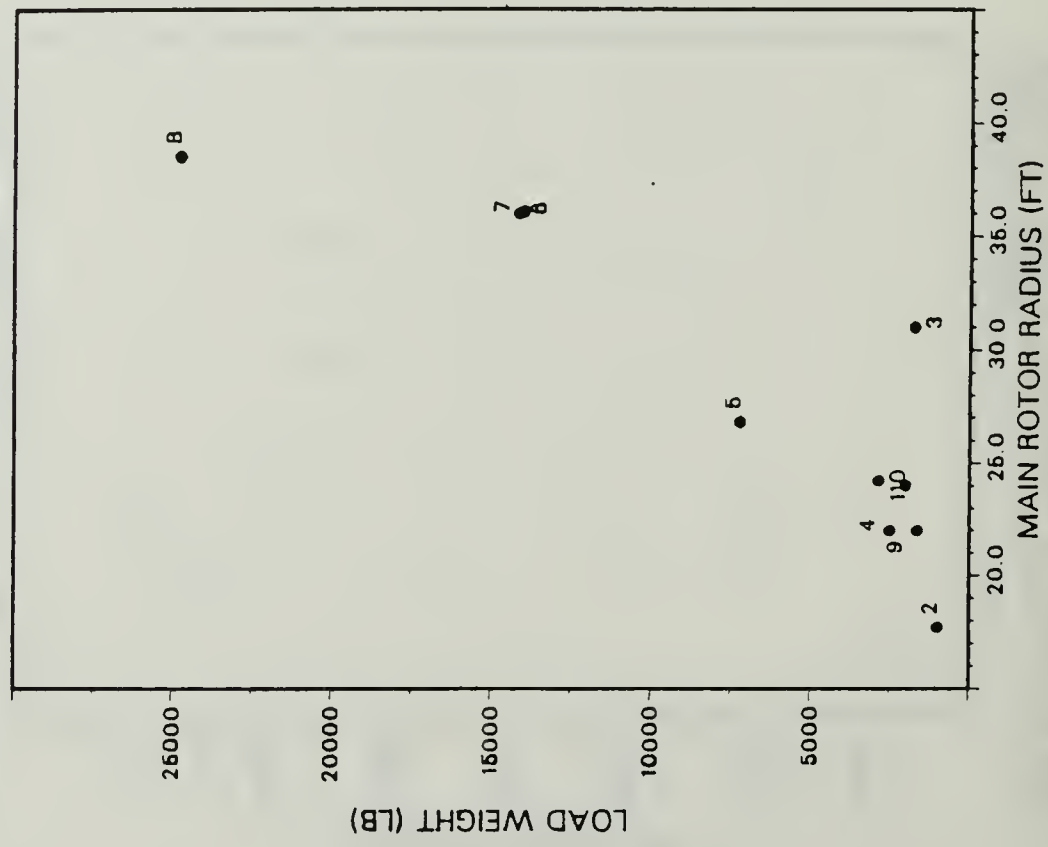


Fig. 1-28a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

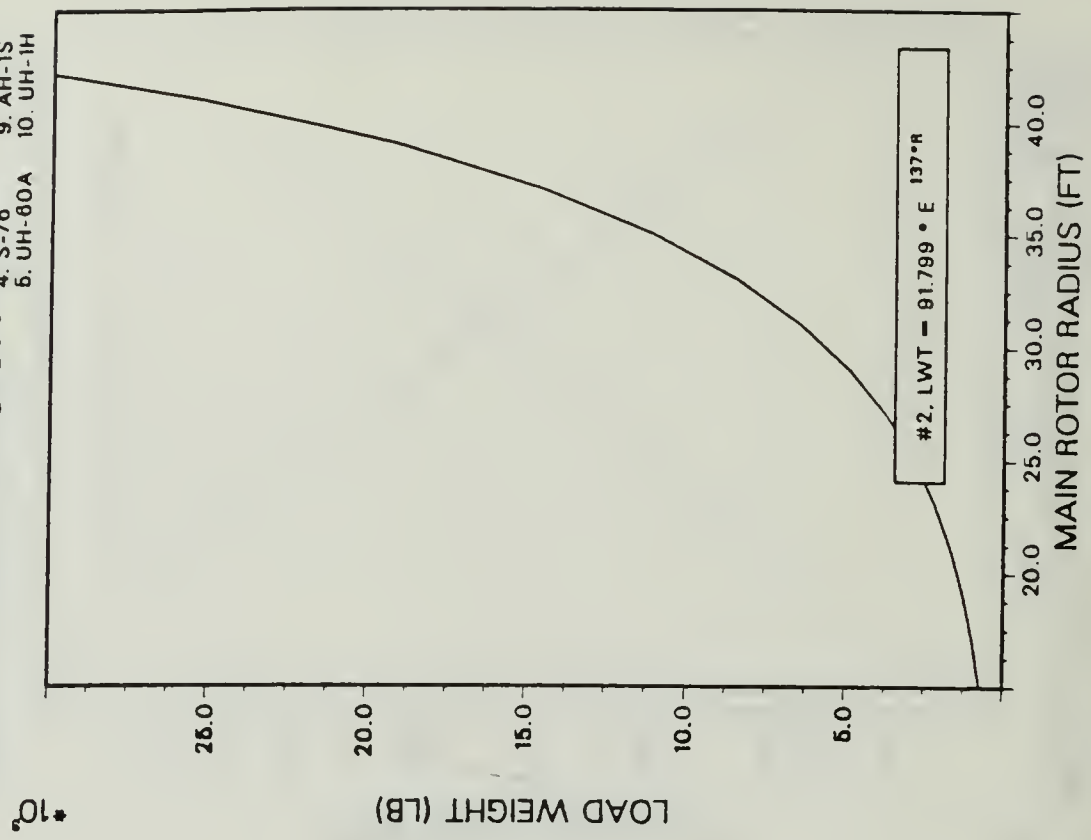


Fig. 1-28b.

Fig. 1-28a and 1-28b.

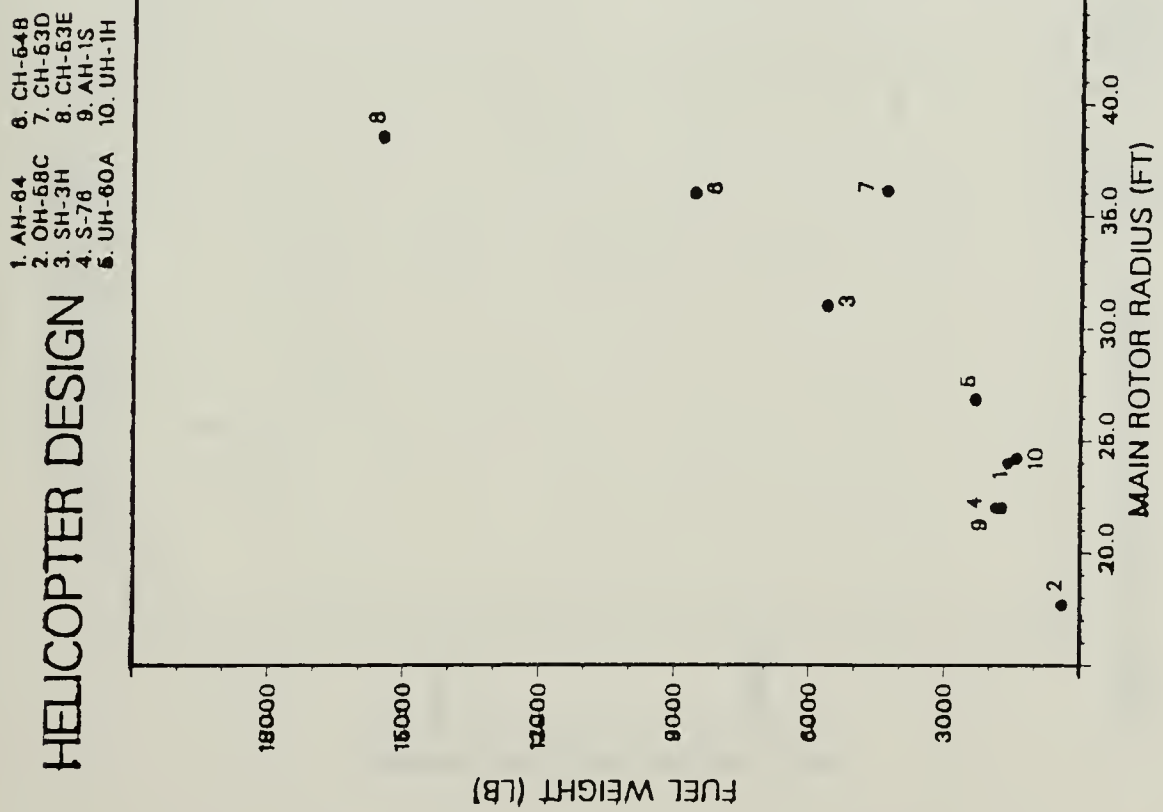


Fig. 1-29a.

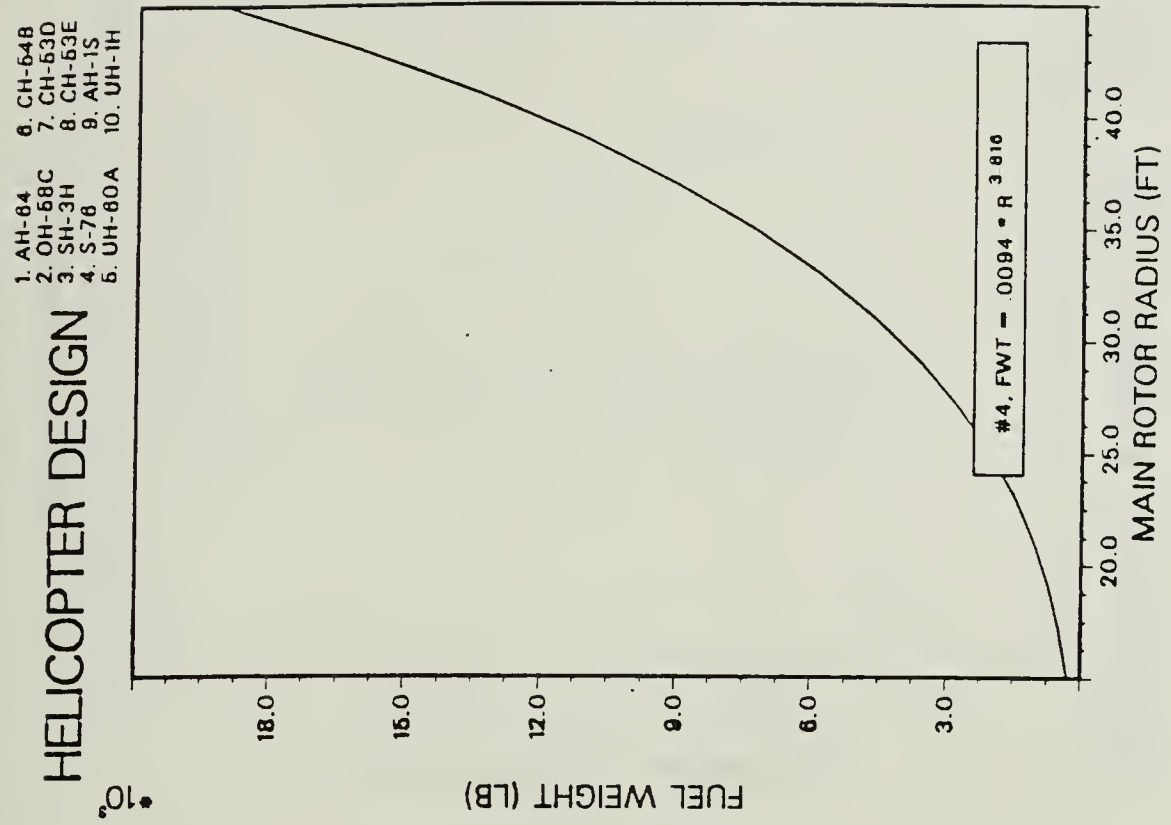


Fig. 1-29b.

Fig. 1-29a and 1-29b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

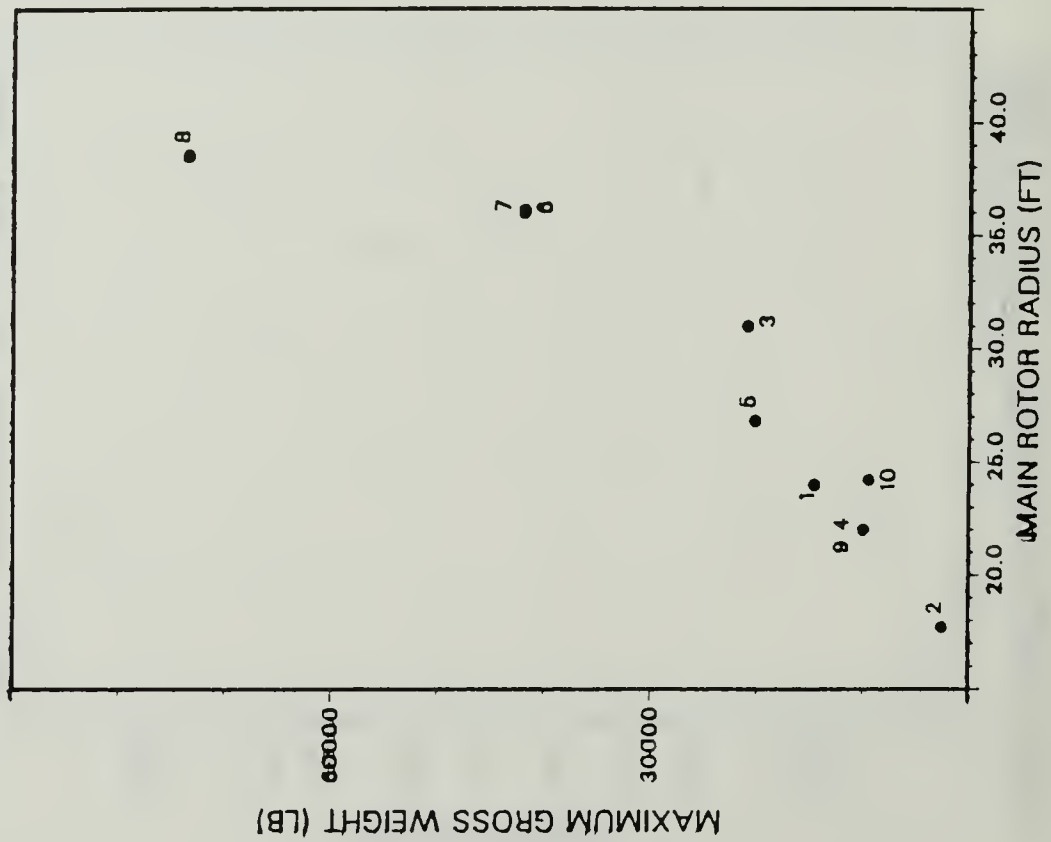


Fig. 1-30a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

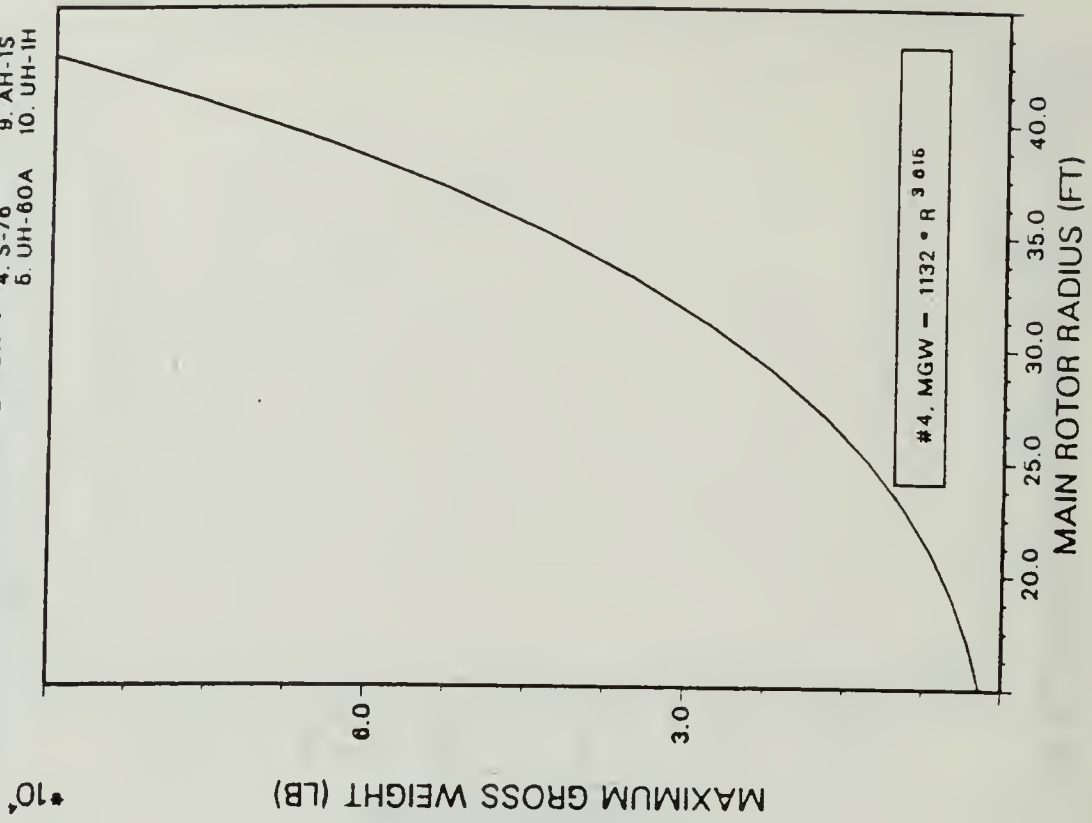


Fig. 1-30b.

Fig. 1-30a and 1-30b.

Tail Rotor Radius Pairings.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

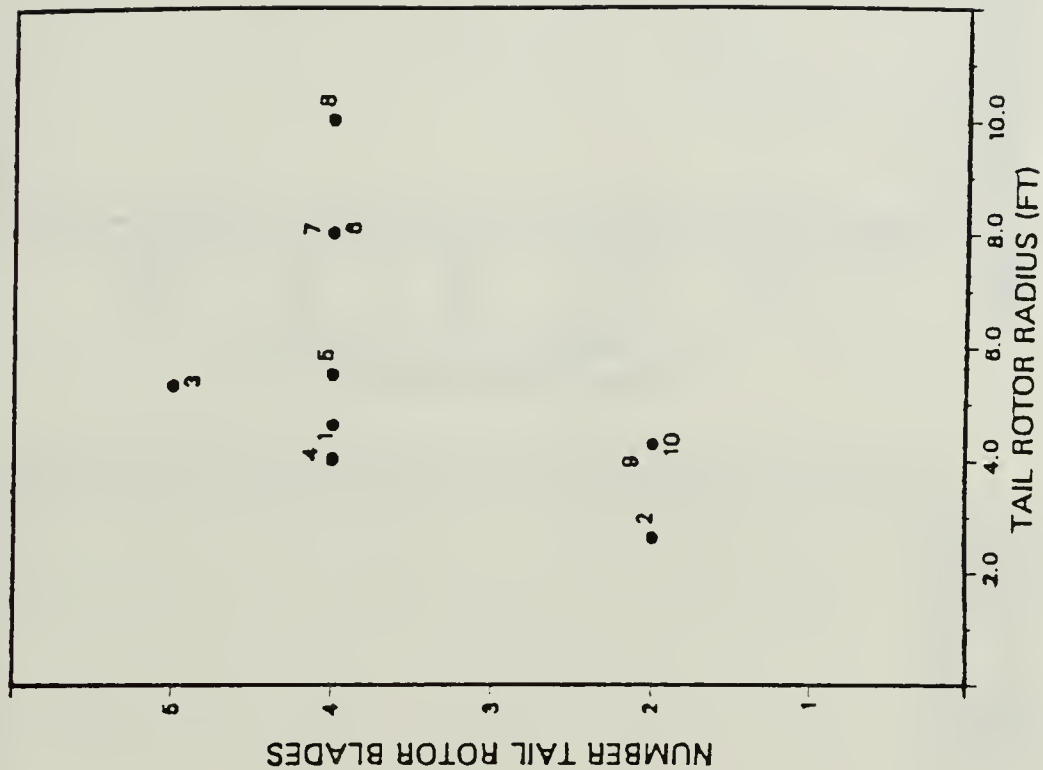


Fig. 2-4.

Fig. 2-4.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

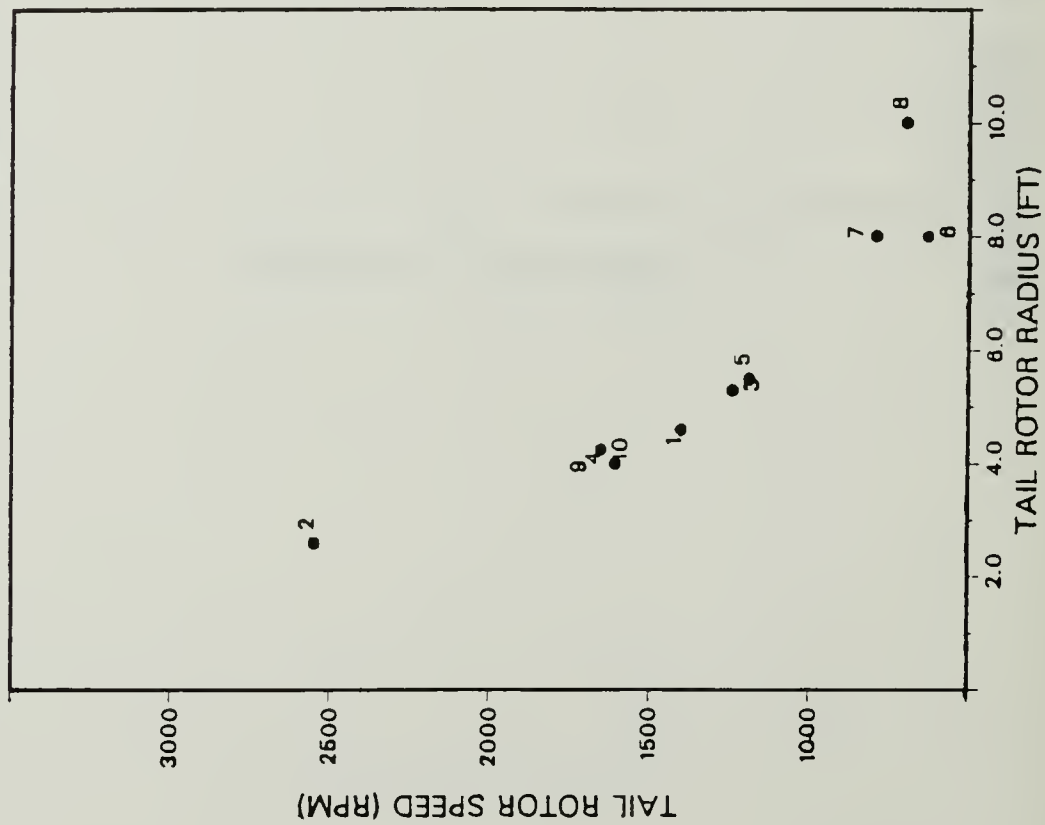


Fig. 2-7a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

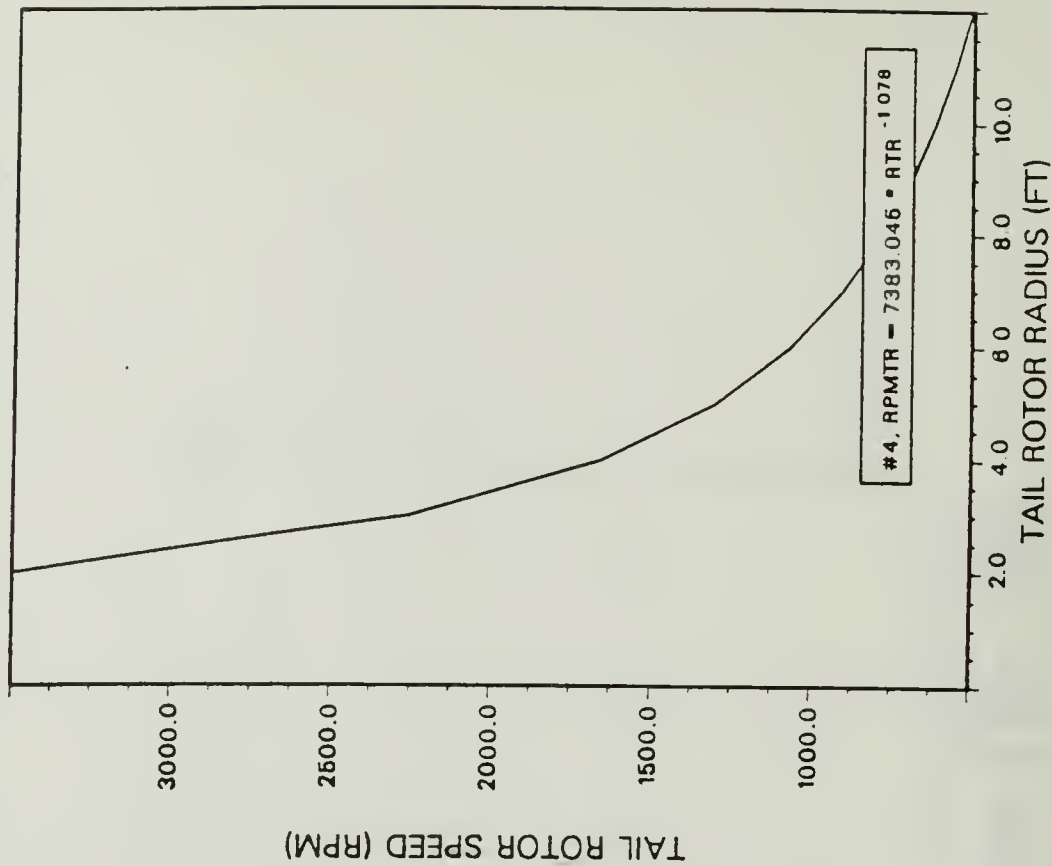


Fig. 2-7b.

Fig. 2-7a and 2-7b.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

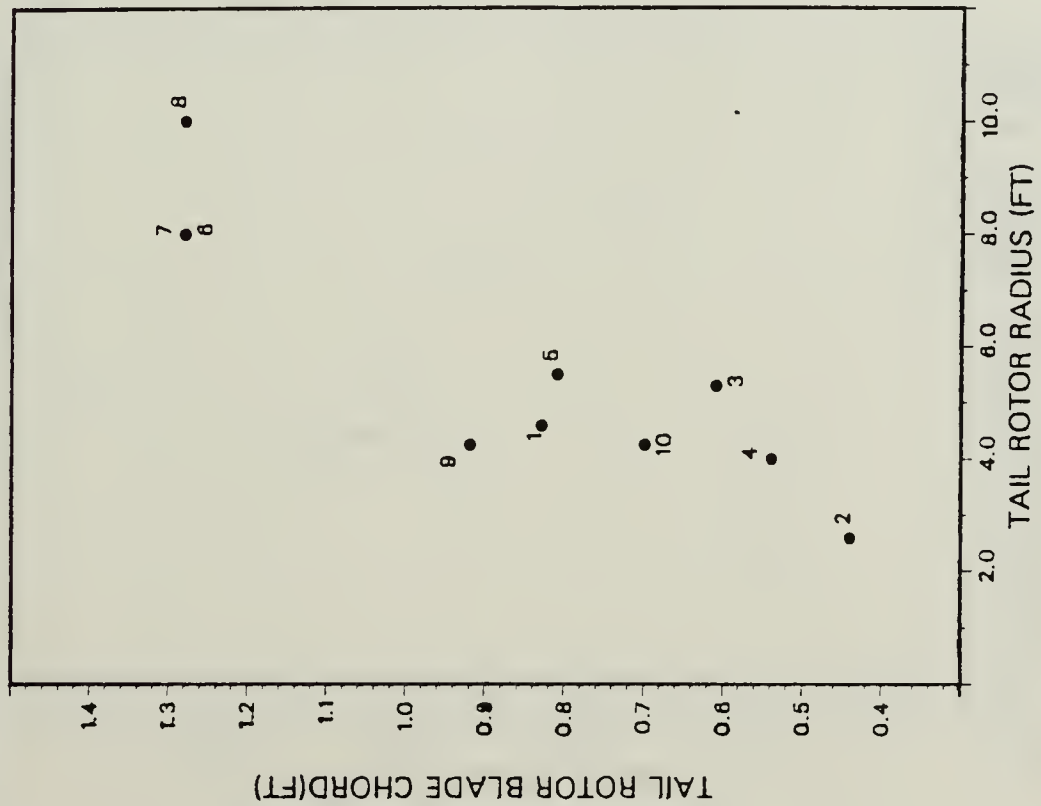


Fig. 2-9a.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

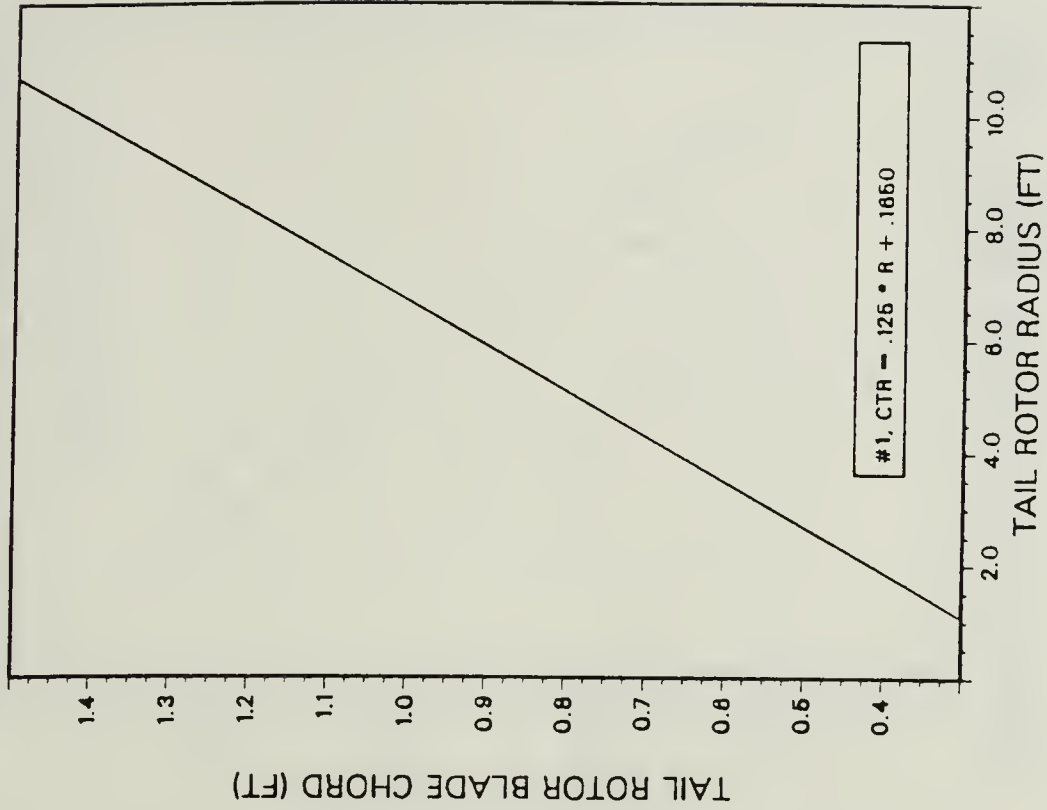


Fig. 2-9b.

Fig. 2-9a and 2-9b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

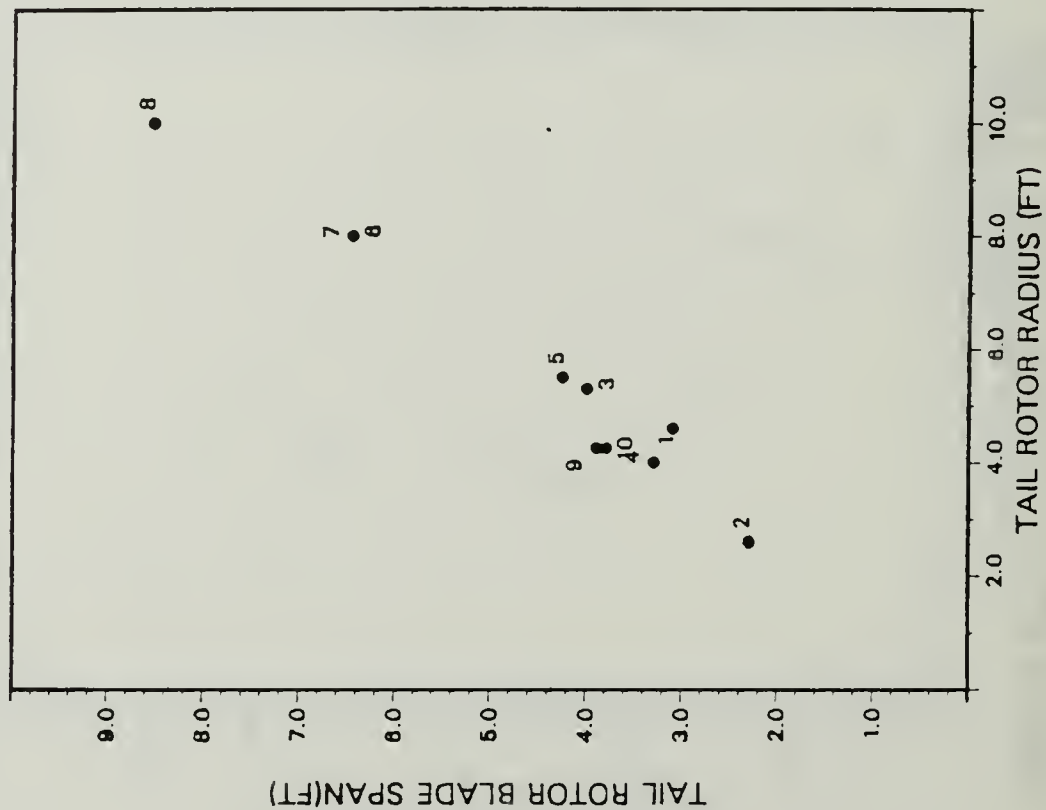


Fig. 2-11a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

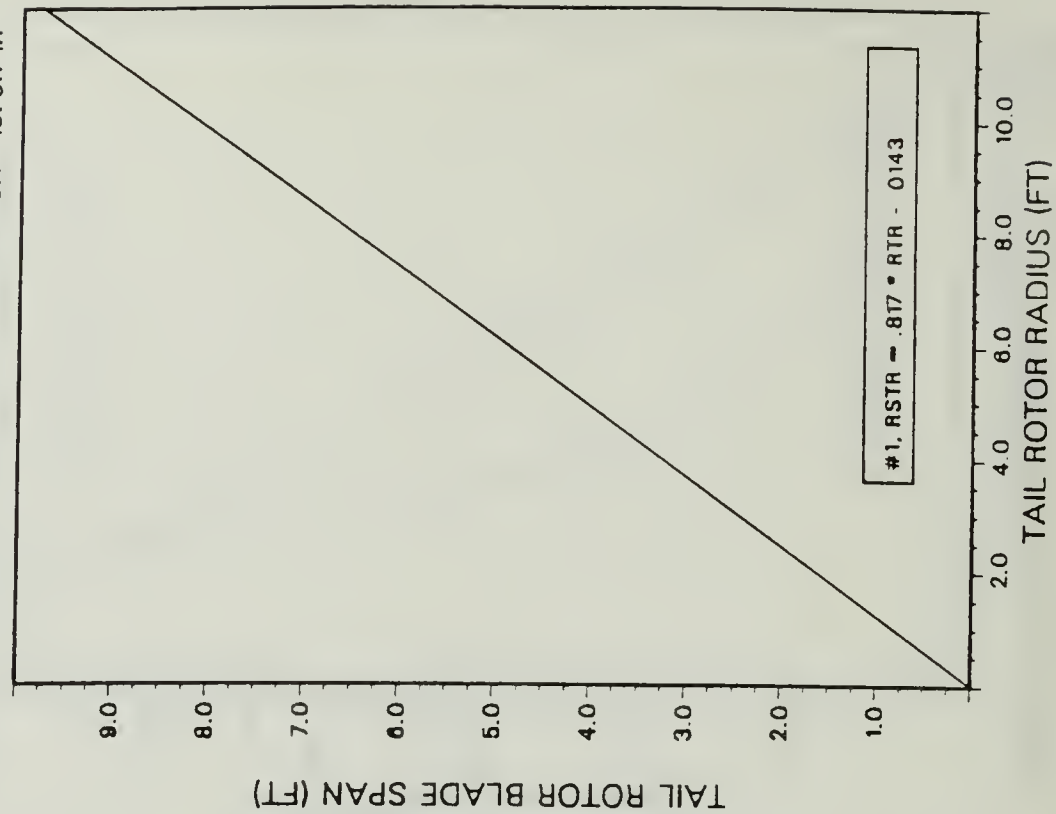


Fig. 2-11b.

Fig. 2-11a and 2-11b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

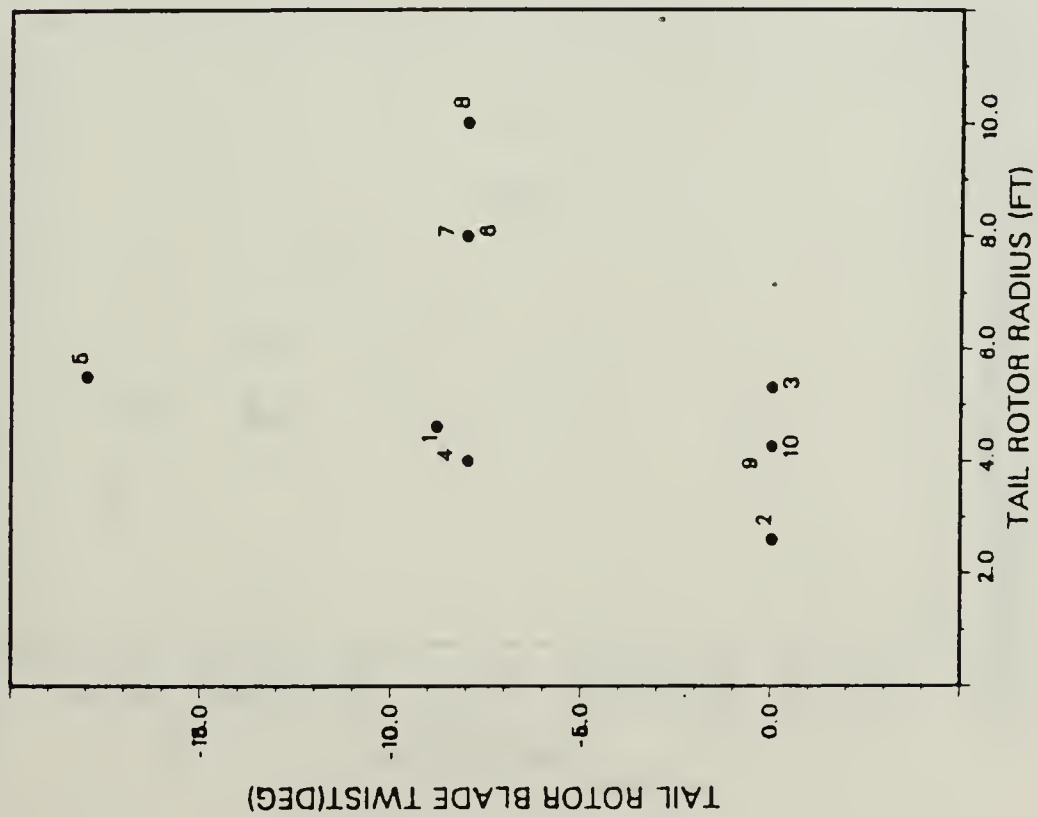


Fig. 2-13.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

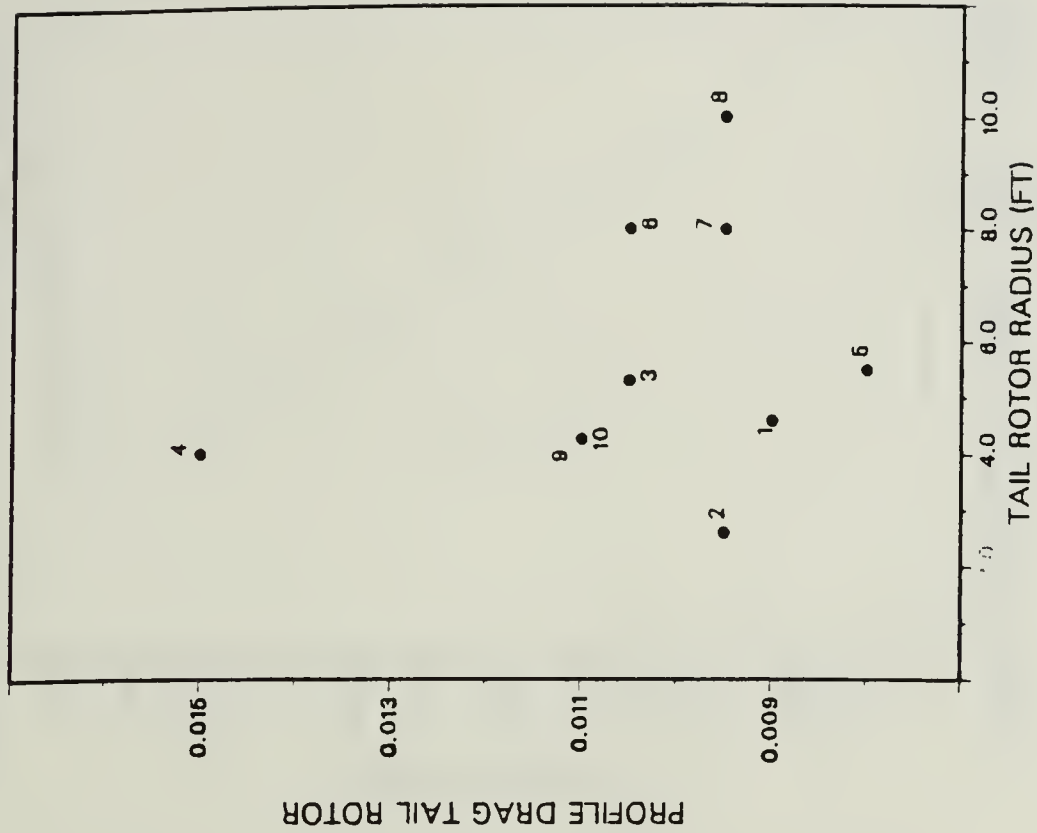


Fig. 2-15.

Fig. 2-13 and 2-15.

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

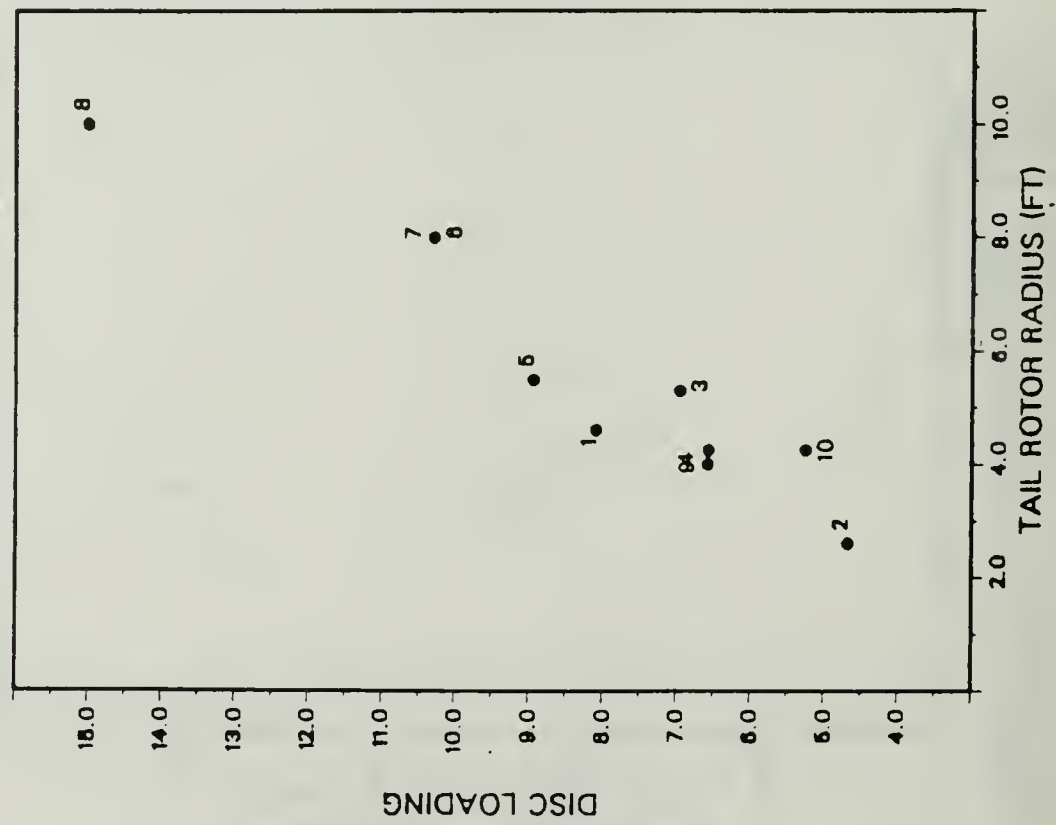


Fig. 2-16a.

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

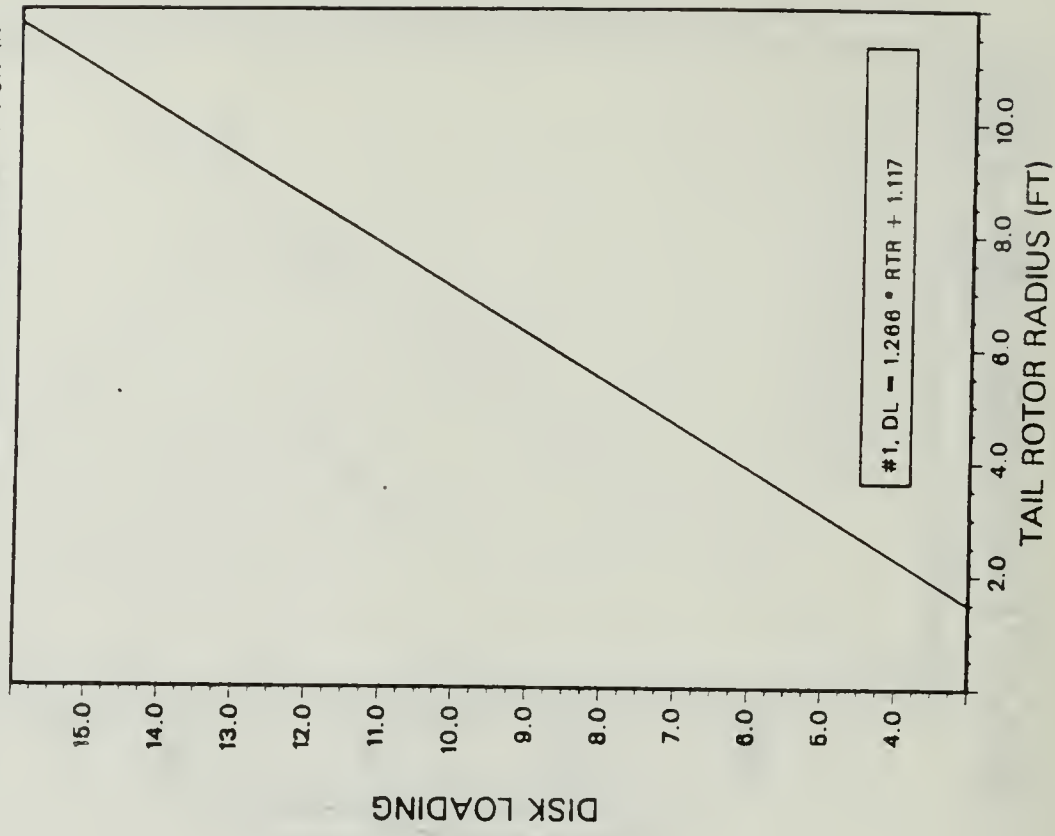


Fig. 2-16b.

Fig. 2-16a and 2-16b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

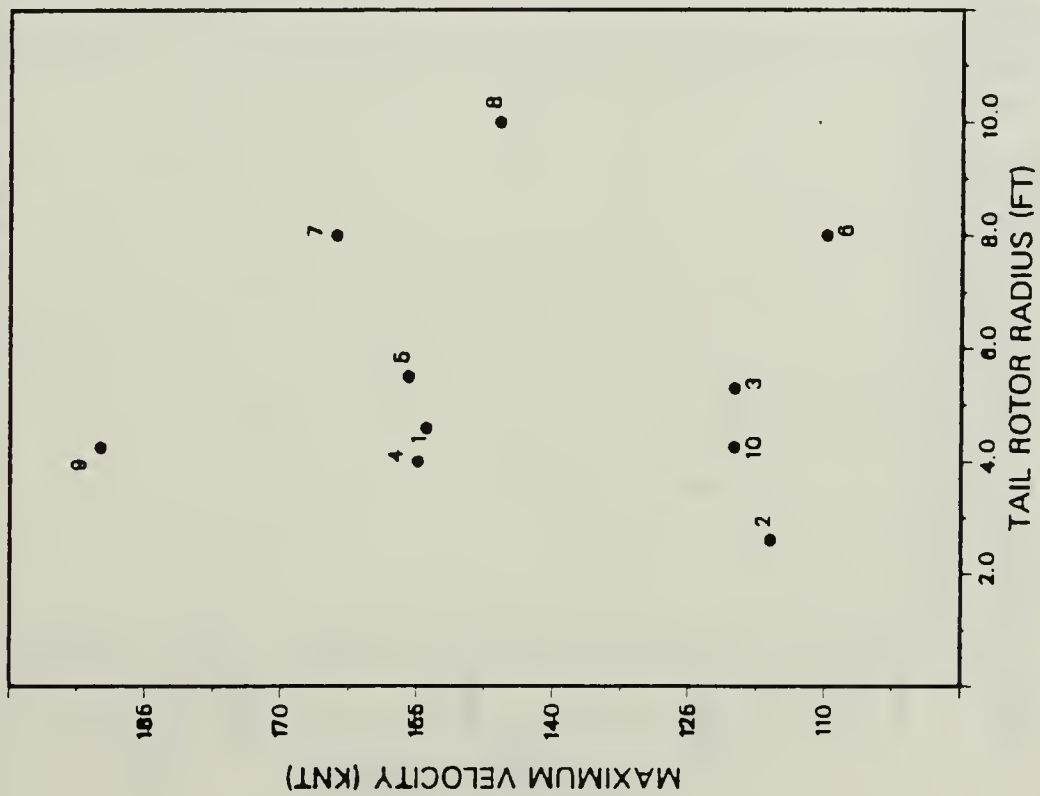


Fig. 2-21.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

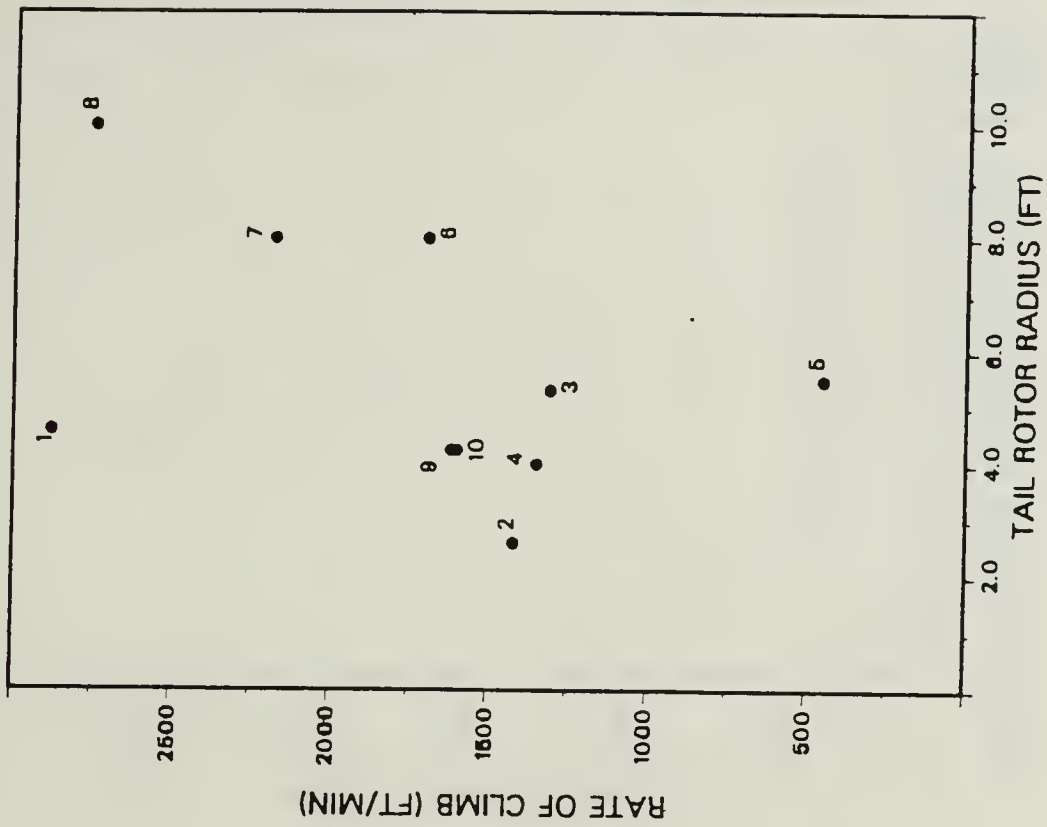


Fig. 2-23.

Fig. 2-21 and 2-23.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-53D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

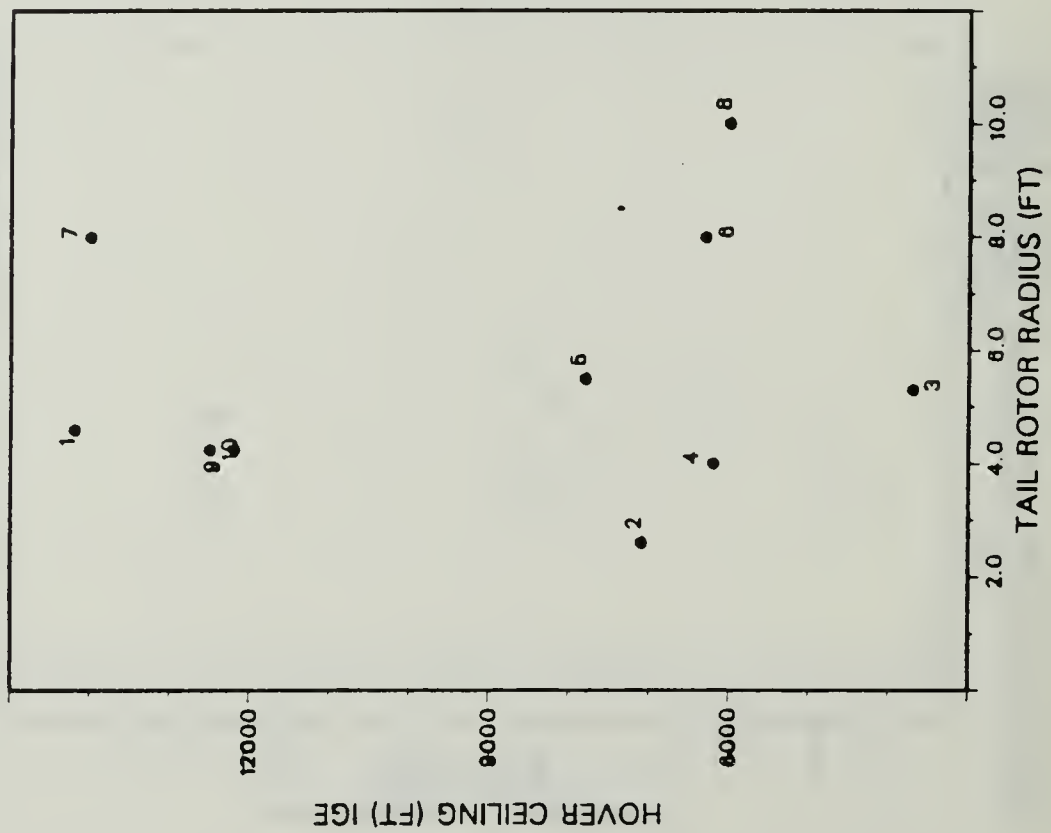


Fig. 2-24.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-53D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

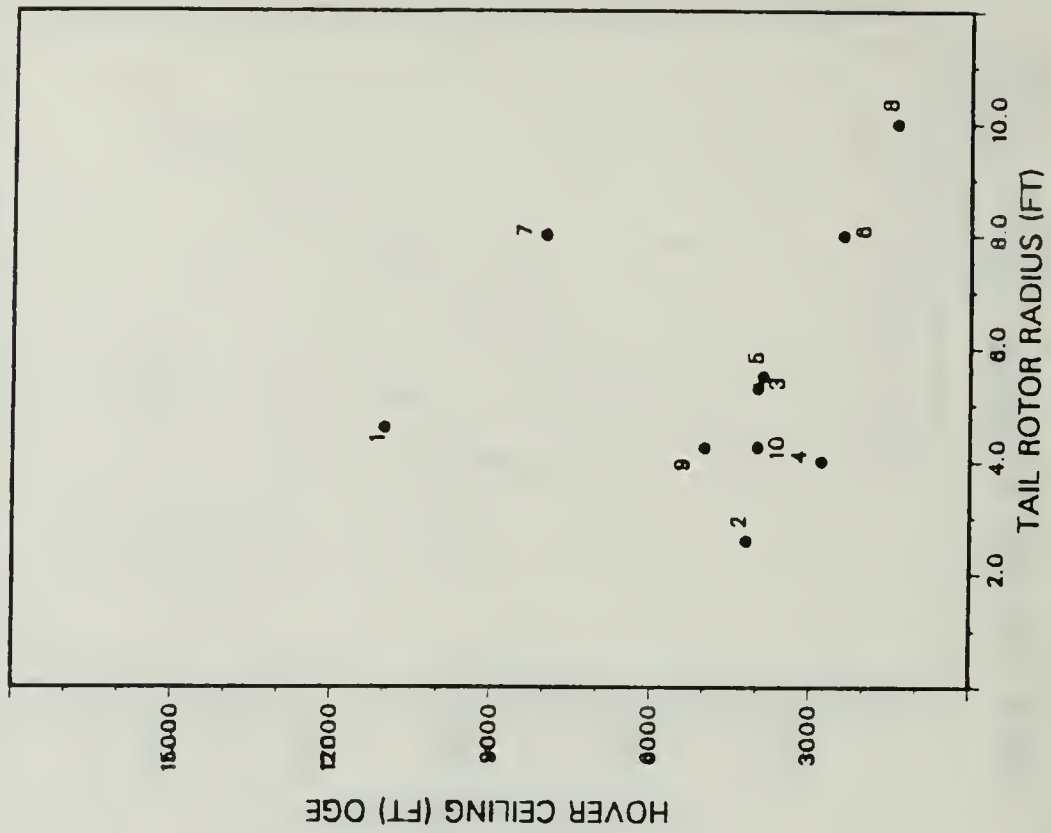


Fig. 2-25.

Fig. 2-24 and 2-25.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

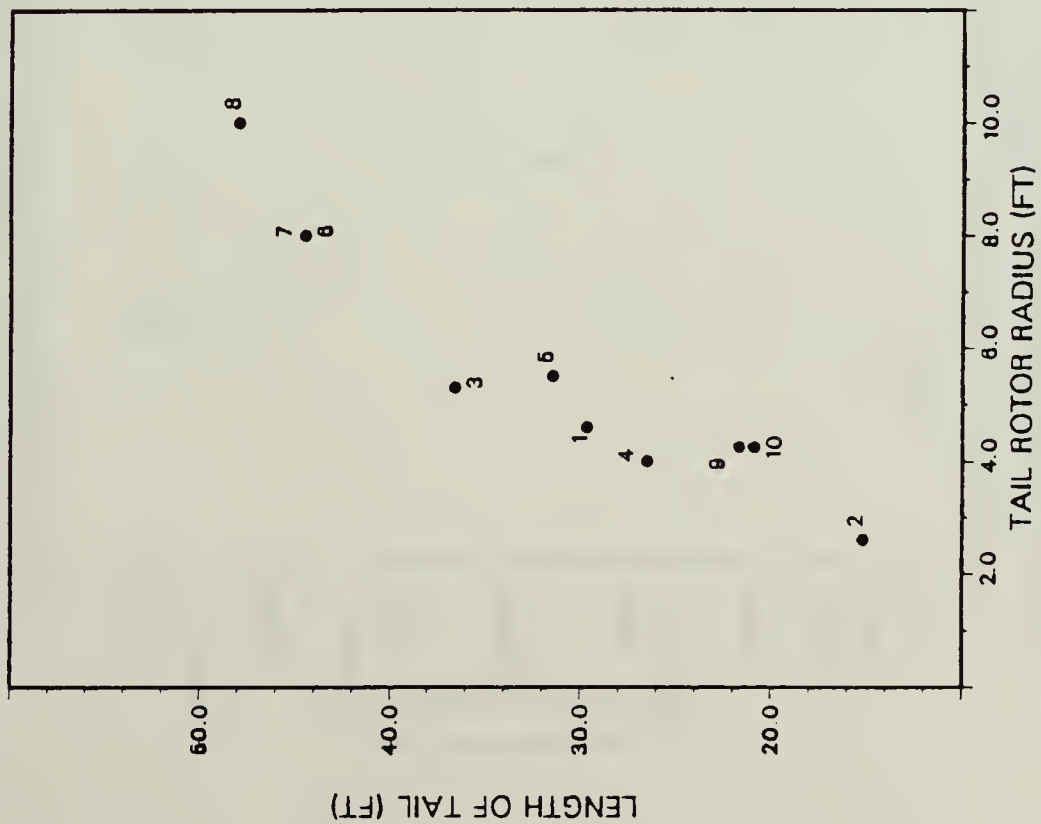


Fig. 2-26a.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

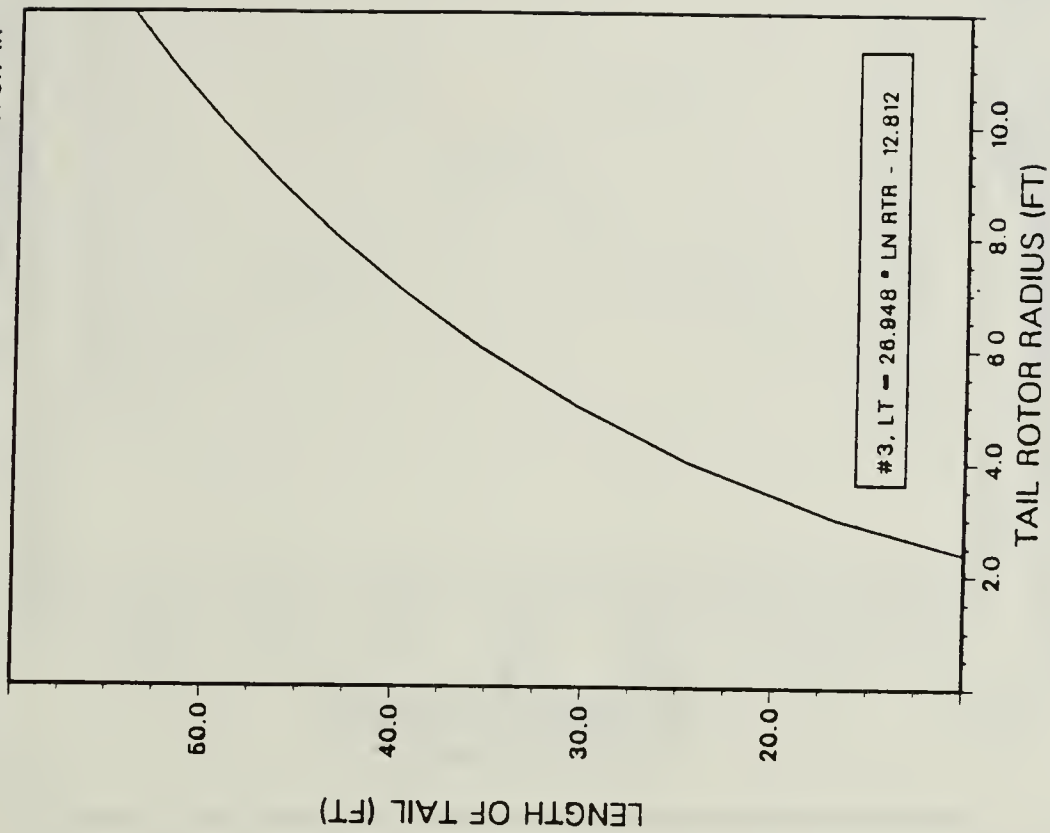


Fig. 2-26b.

Fig. 2-26a and 2-26b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

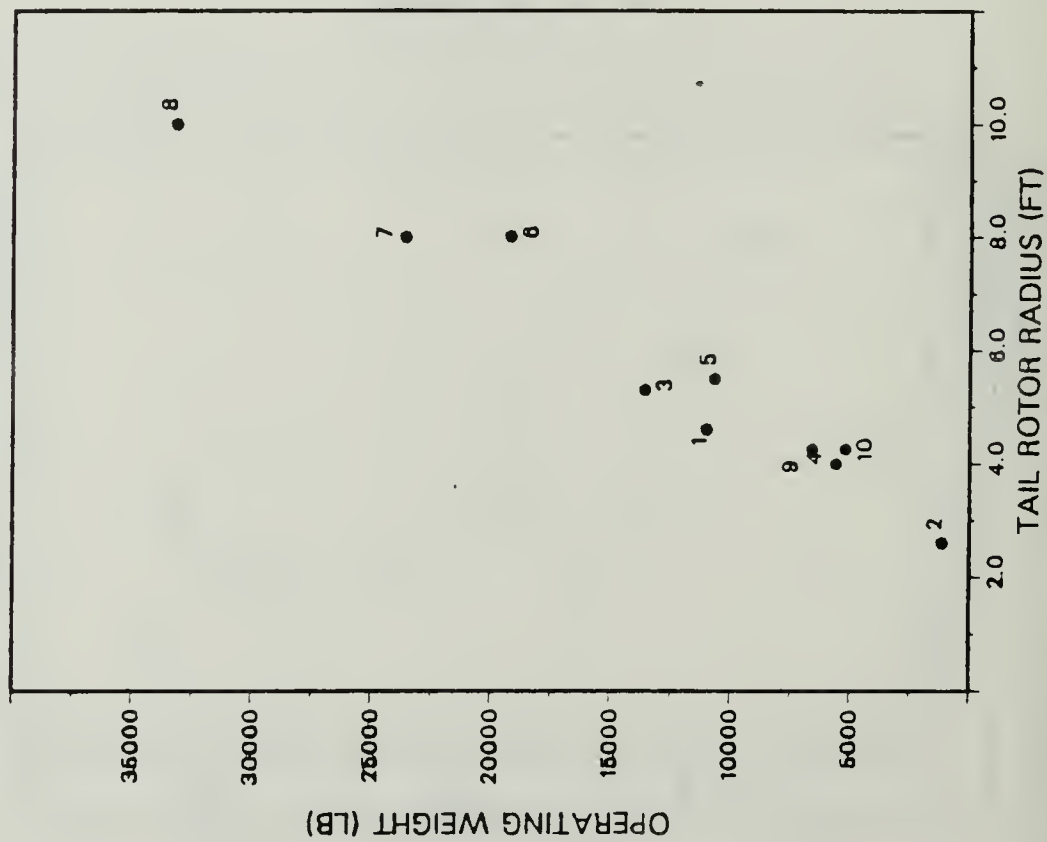


Fig. 2-27a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

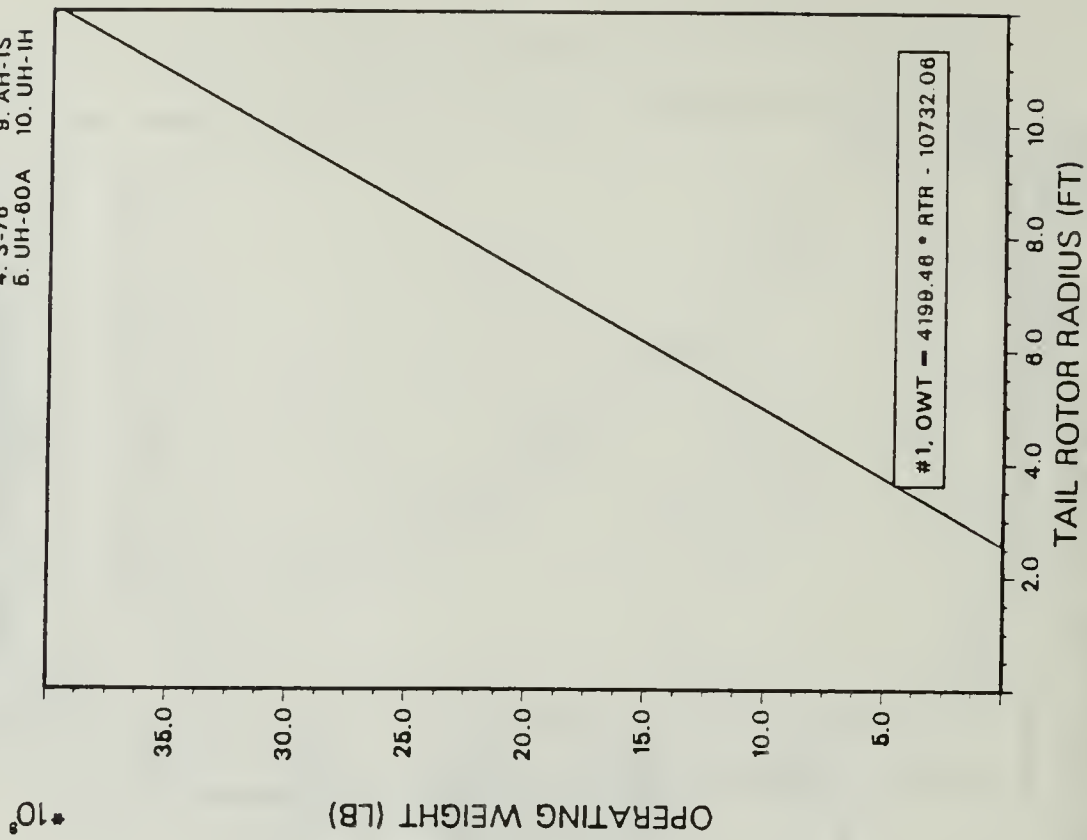


Fig. 2-27b.

Fig. 2-27a and 2-27b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

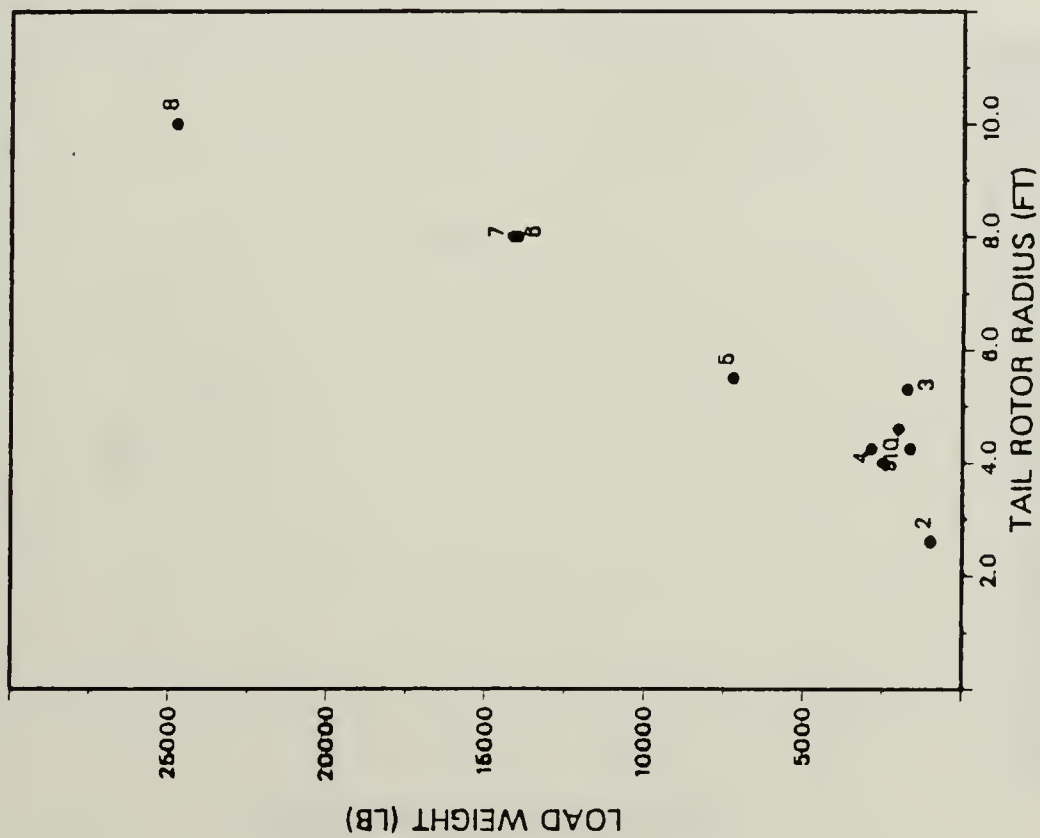


Fig. 2-28a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

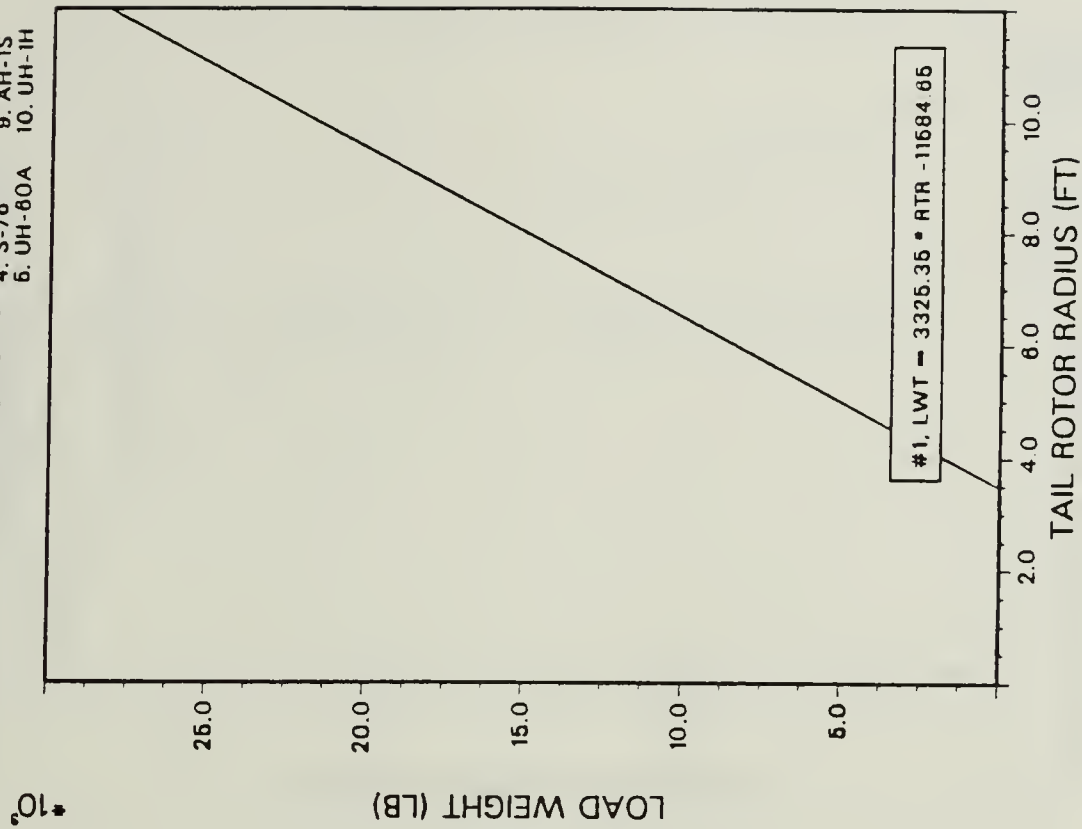


Fig. 2-28b.

Fig. 2-28a and 2-28b.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

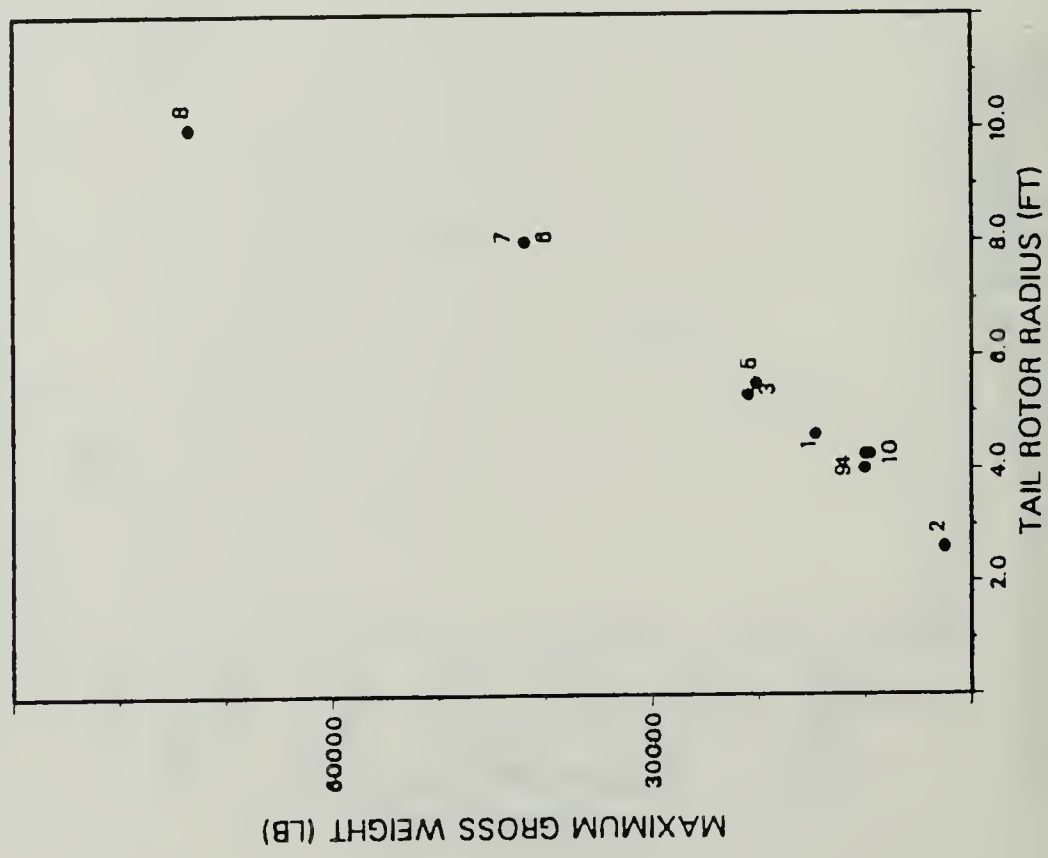


Fig. 2-30a.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

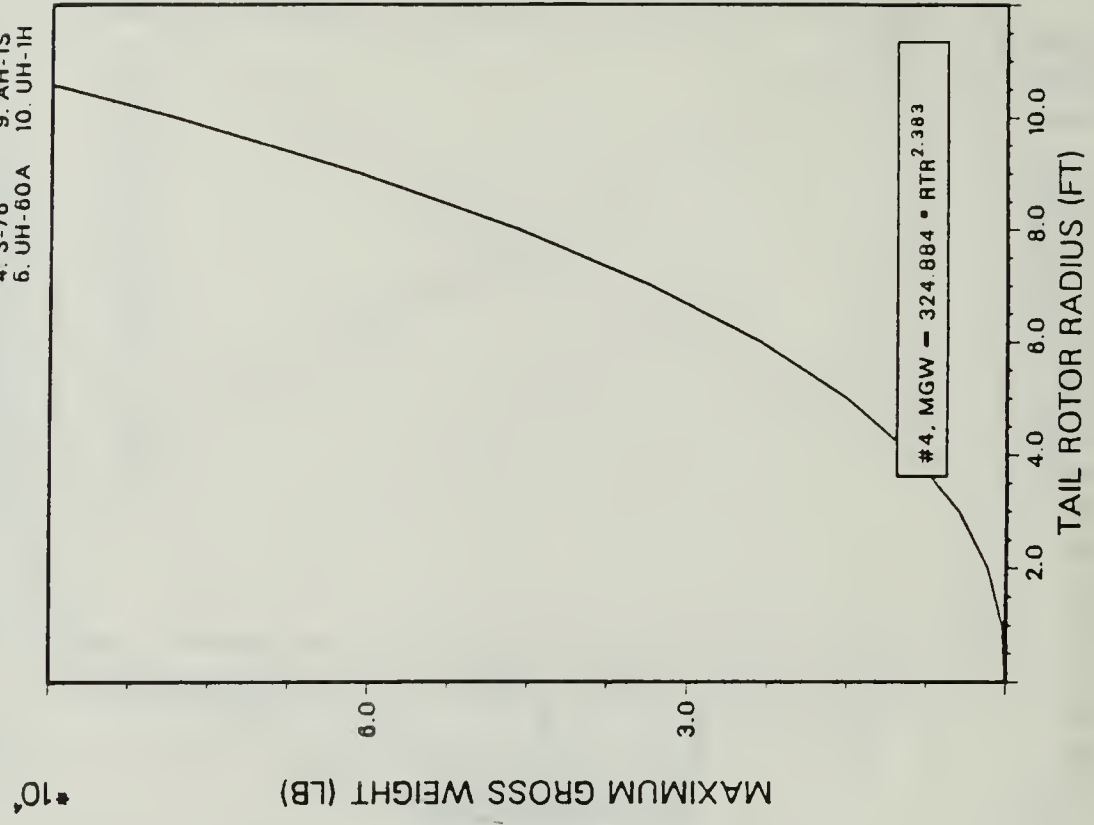


Fig. 2-30b.

Fig. 2-30a and 2-30b.

Number of Main Rotor Blades Pairings.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H



Fig. 3-4a.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

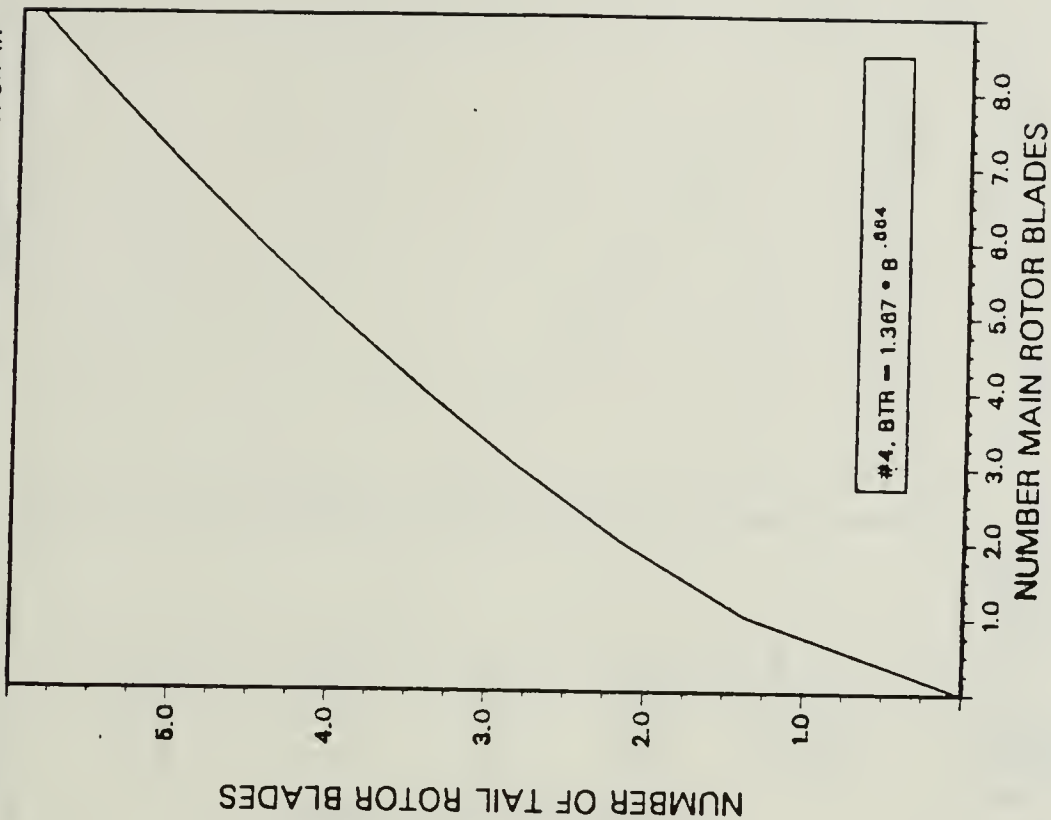


Fig. 3-4b.

Fig. 3-4a and 3-4b.

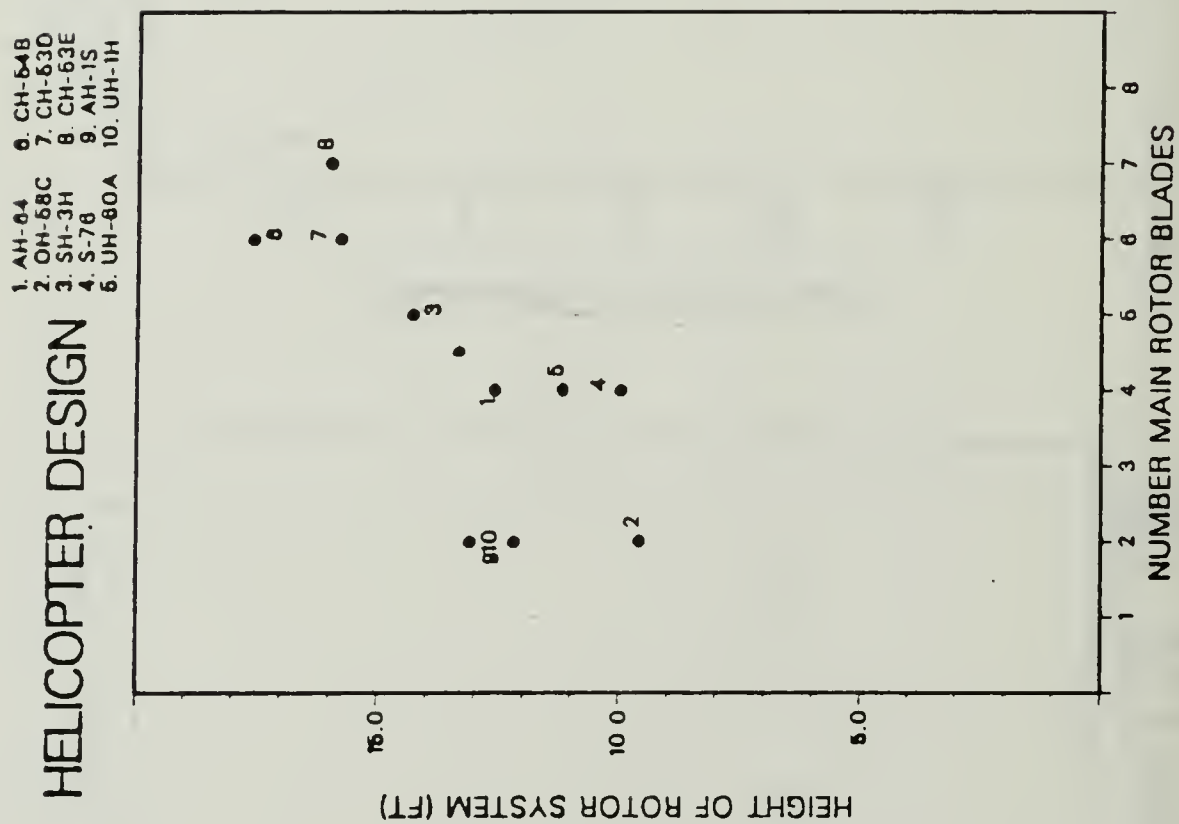


Fig. 3-5.

Fig. 3-5.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

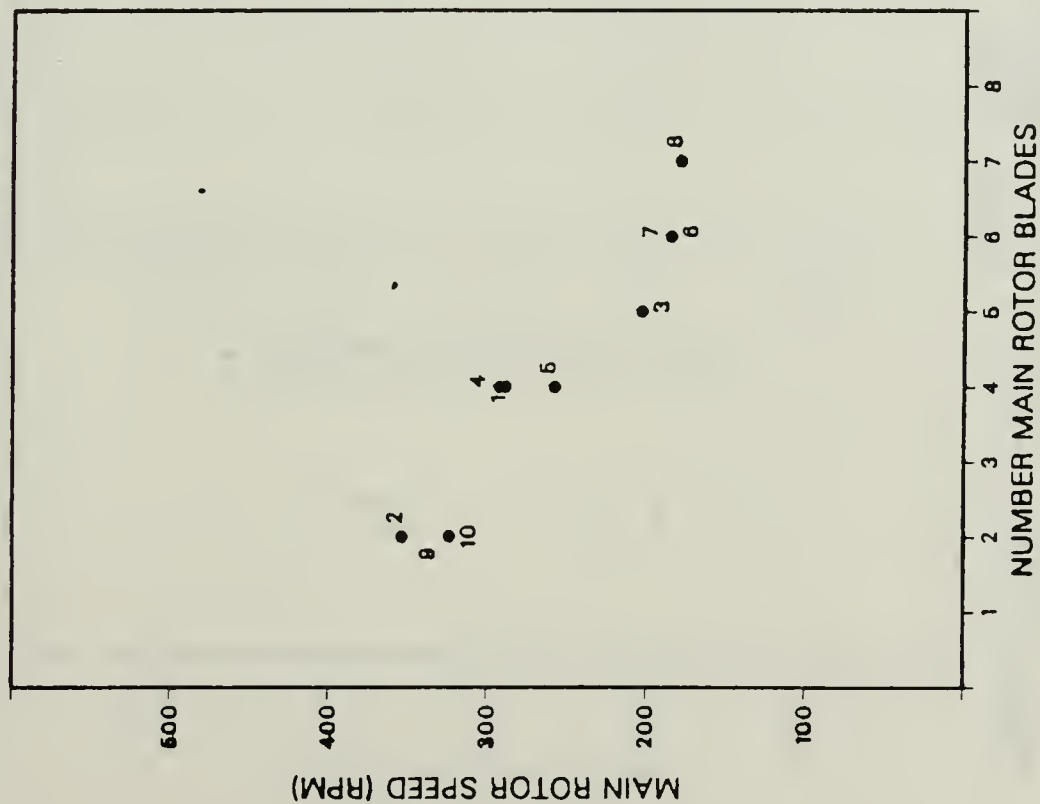


Fig. 3-6a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

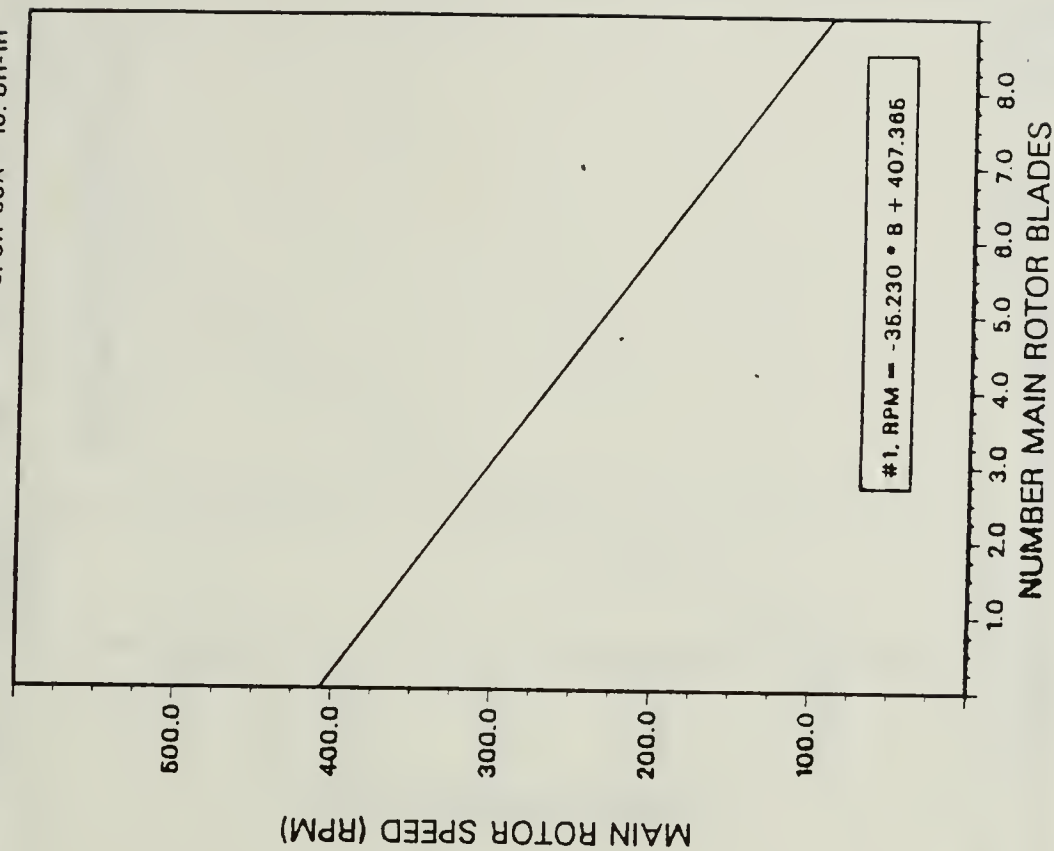


Fig. 3-6b.

Fig. 3-6a and 3-6b.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

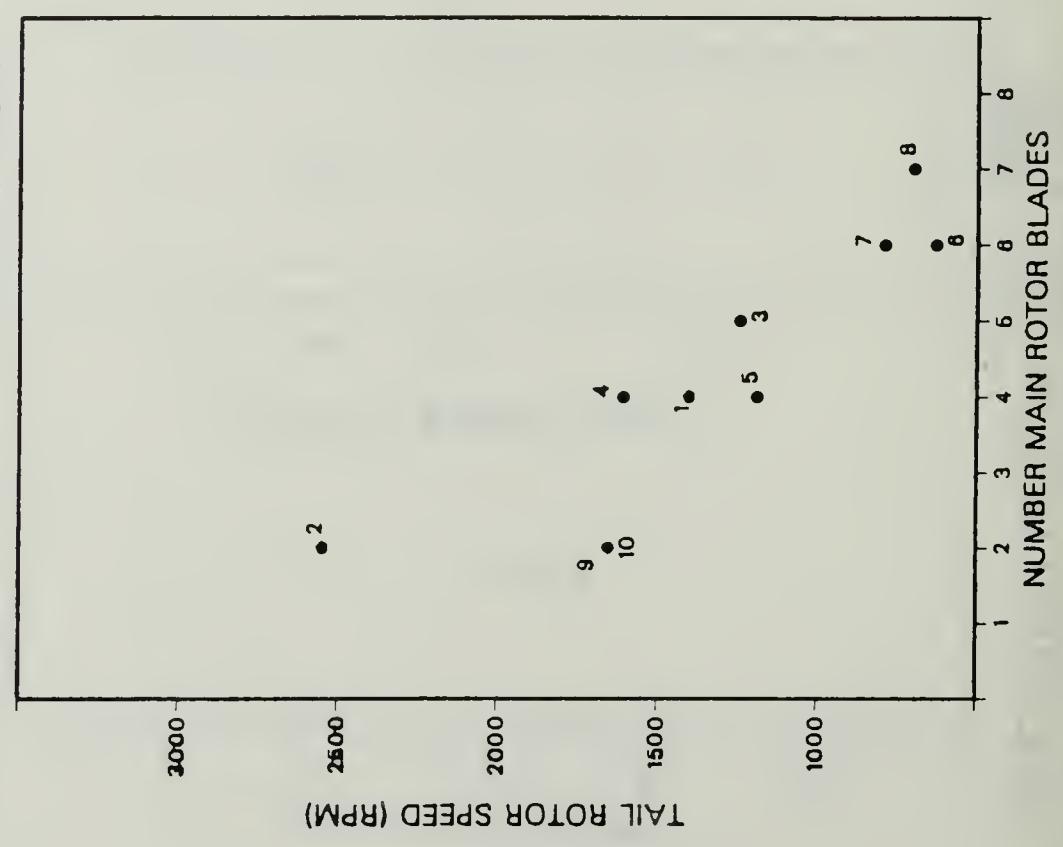


Fig. 3-7a.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

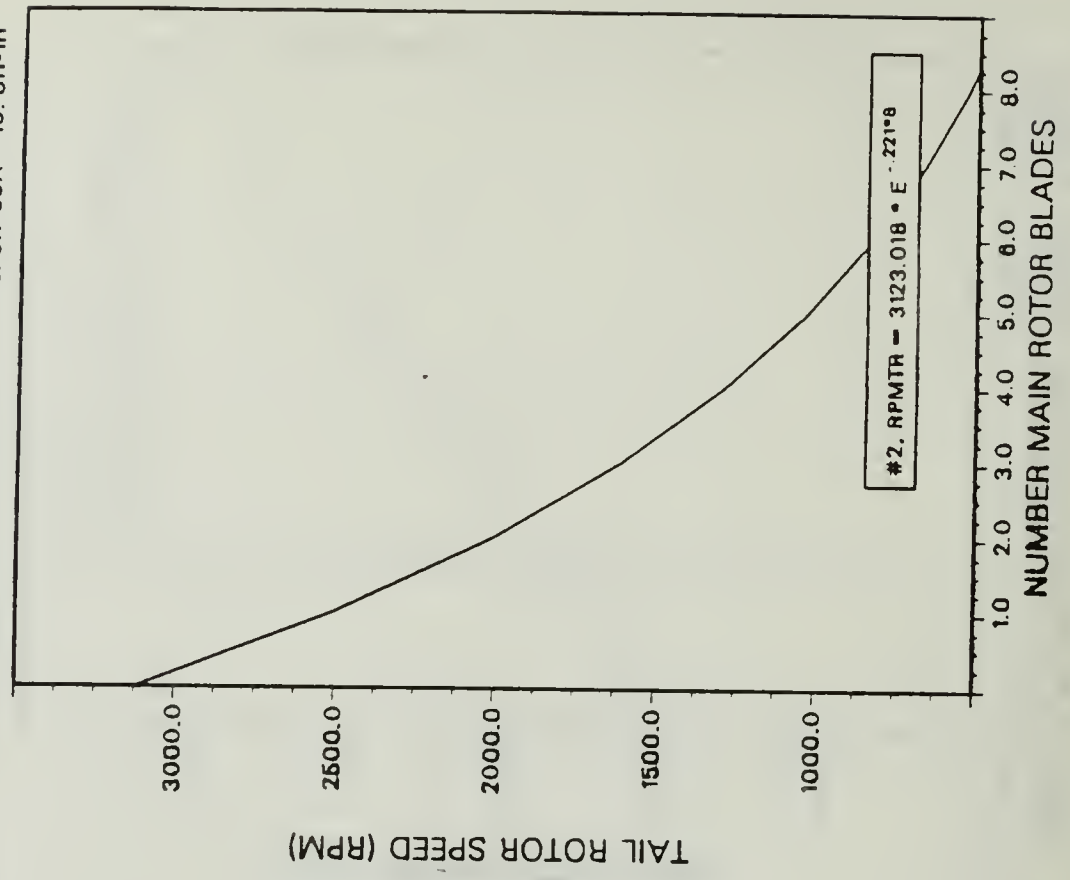


Fig. 3-7b.

Fig. 3-7a and 3-7b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

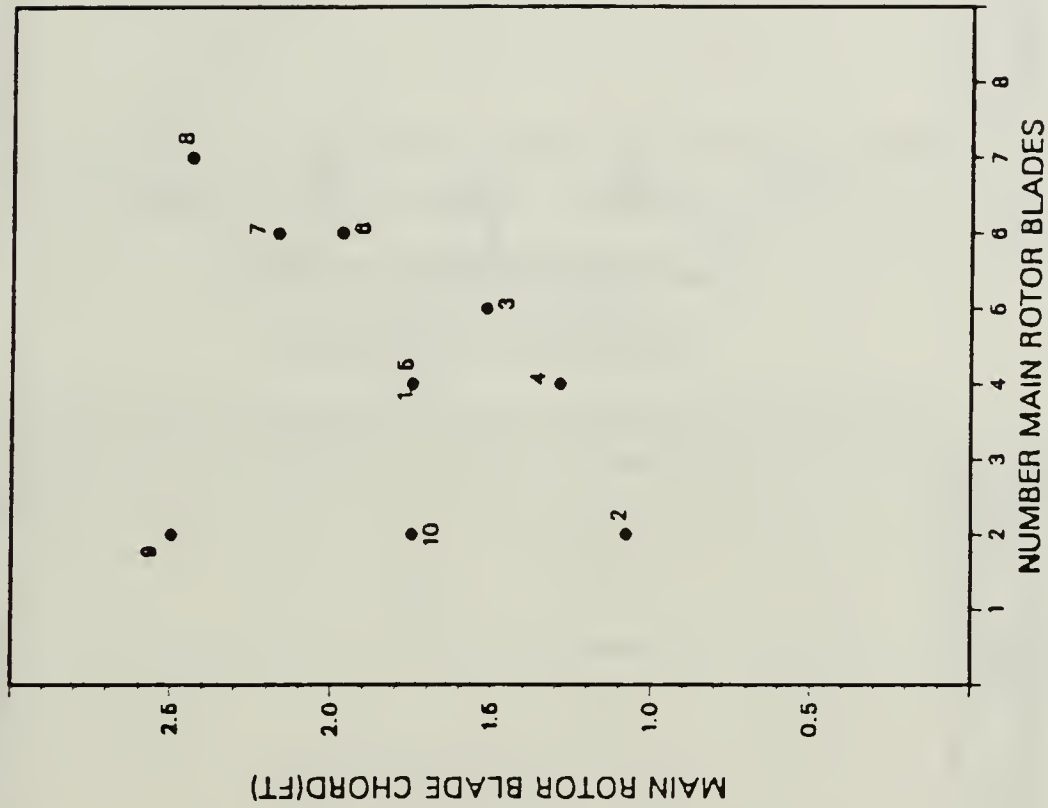


Fig. 3-8.

Fig. 3-8.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

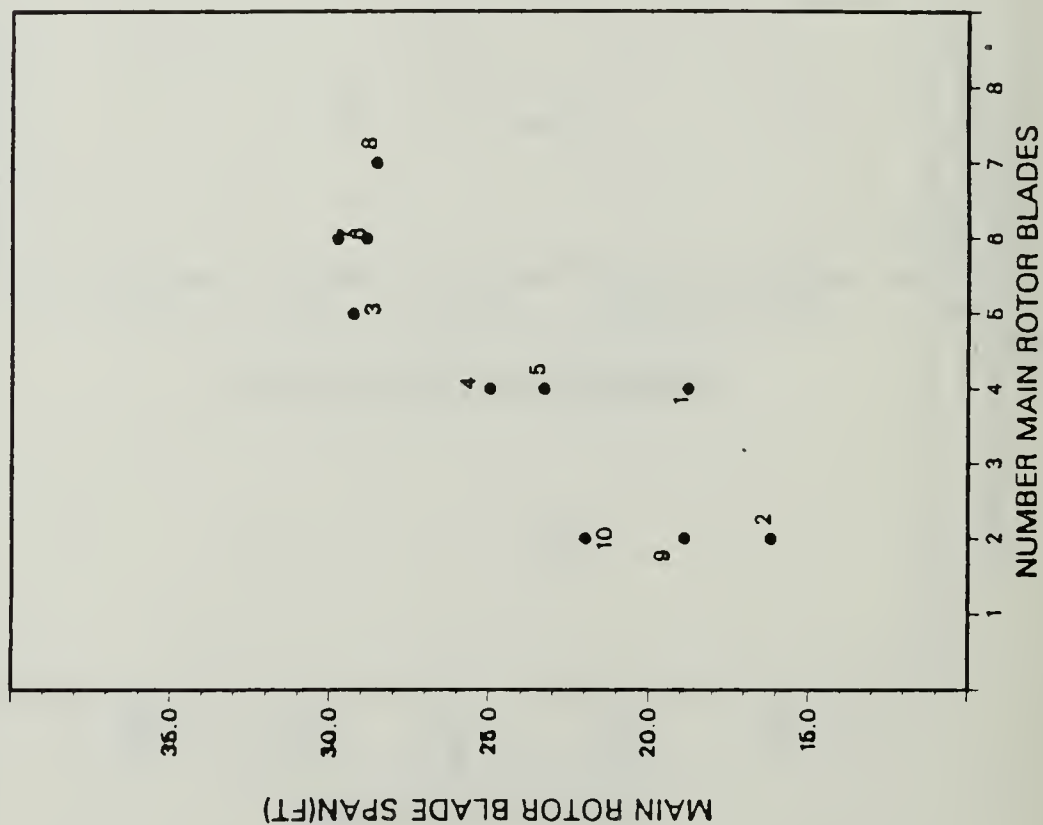


Fig. 3-10a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

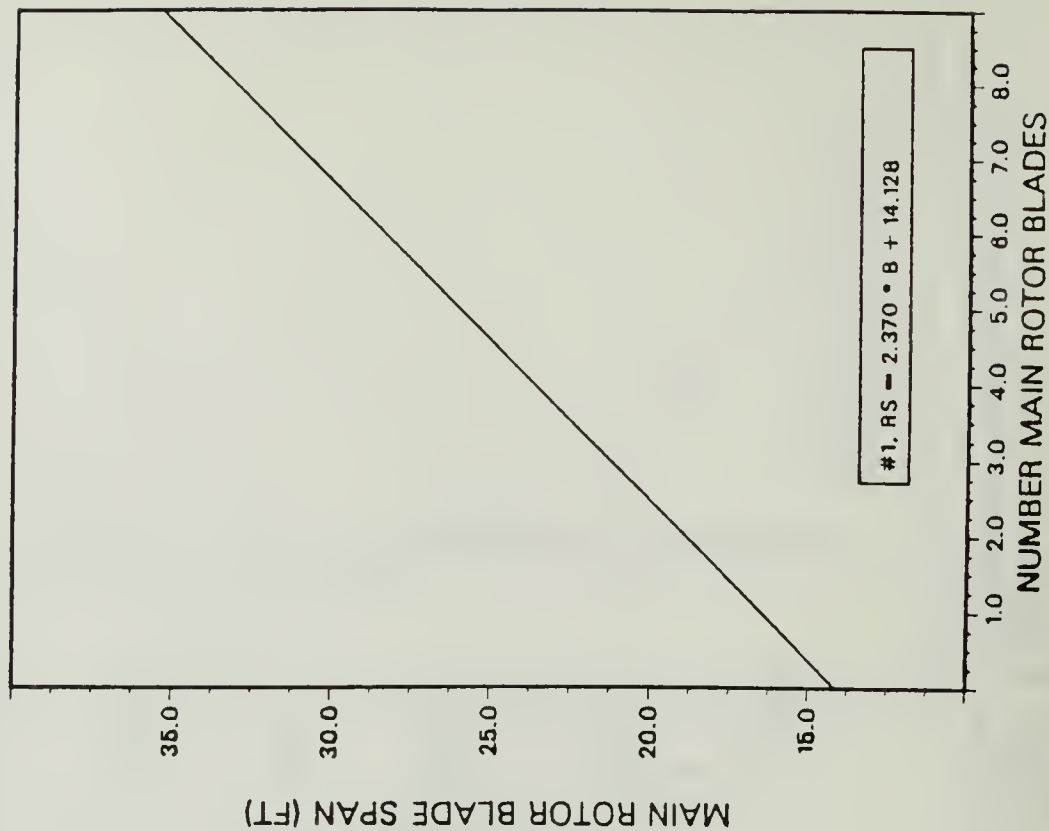


Fig. 3-10b.

Fig. 3-10a and 3-10b.

HELICOPTER DESIGN

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

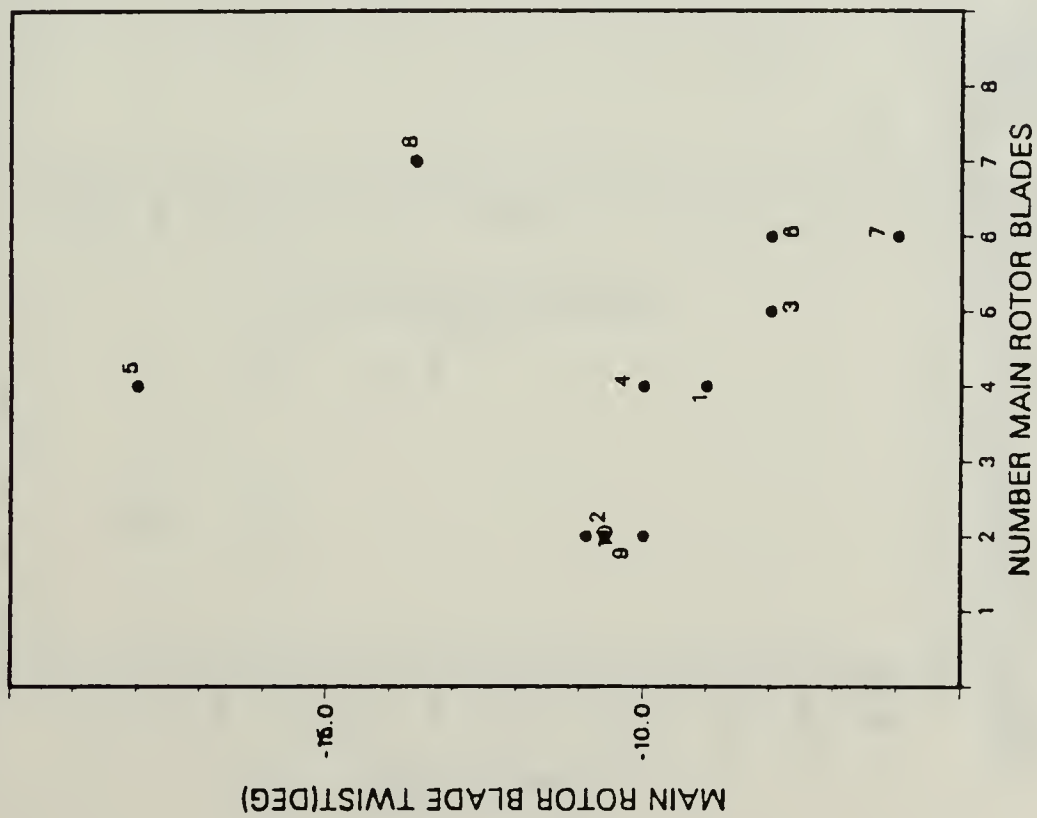


Fig. 3-12.

HELICOPTER DESIGN

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

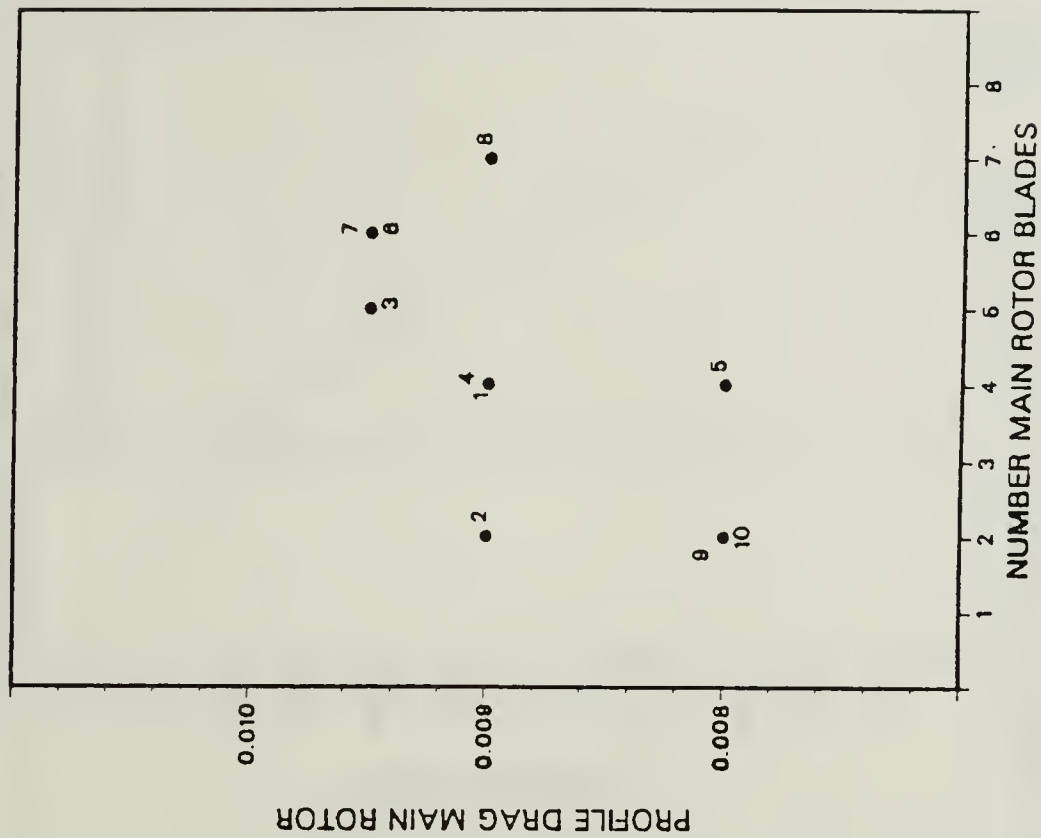


Fig. 3-14.

Fig. 3-12 and 3-14.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

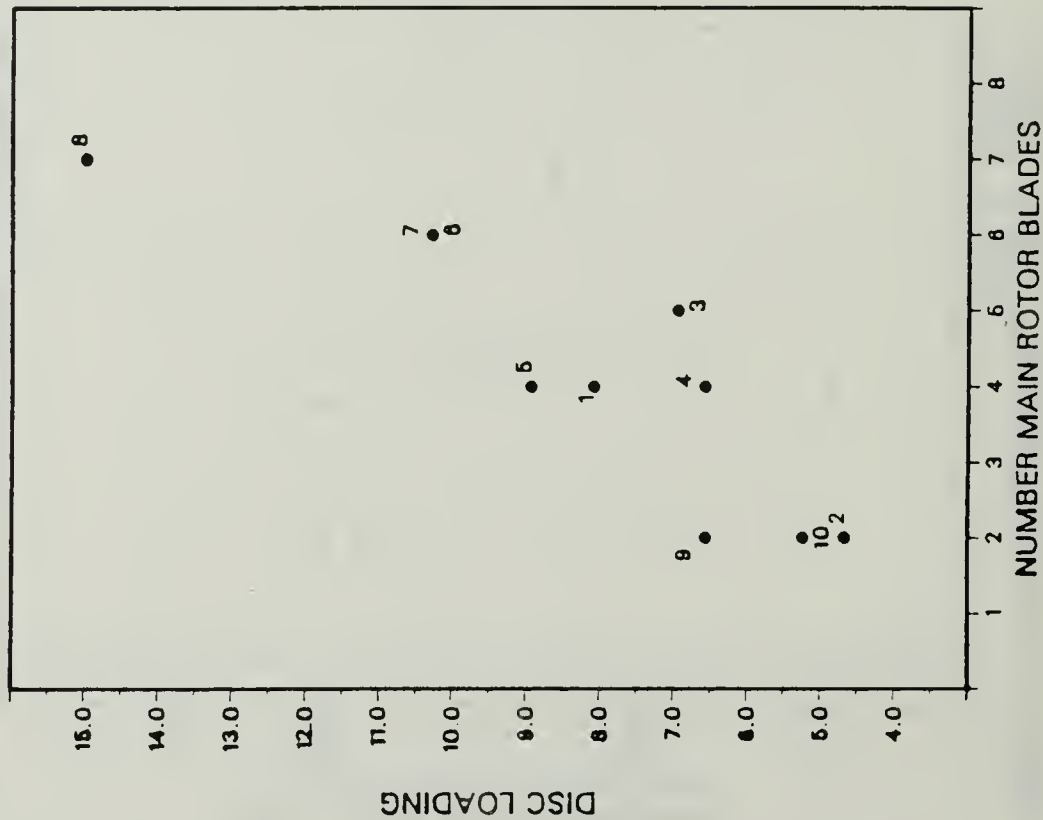


Fig. 3-16a.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

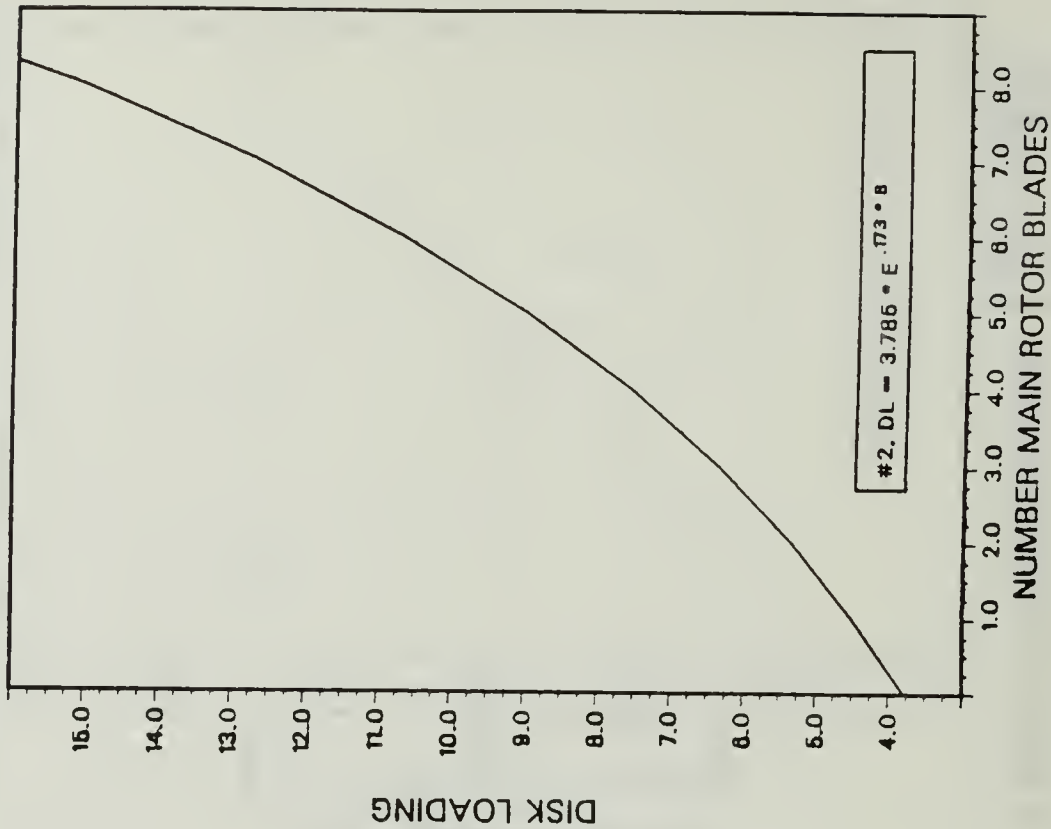


Fig. 3-16b.

Fig. 3-16a and 3-16b.

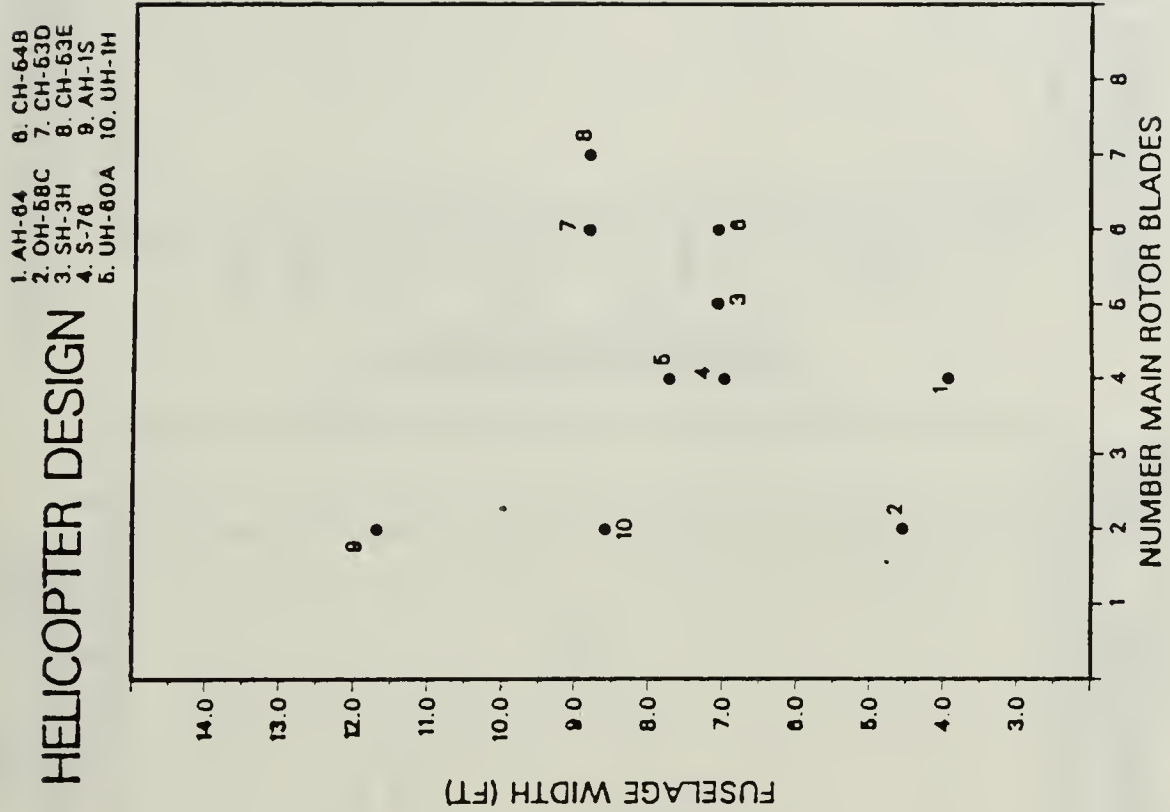


Fig. 3-17.

Fig. 3-17.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

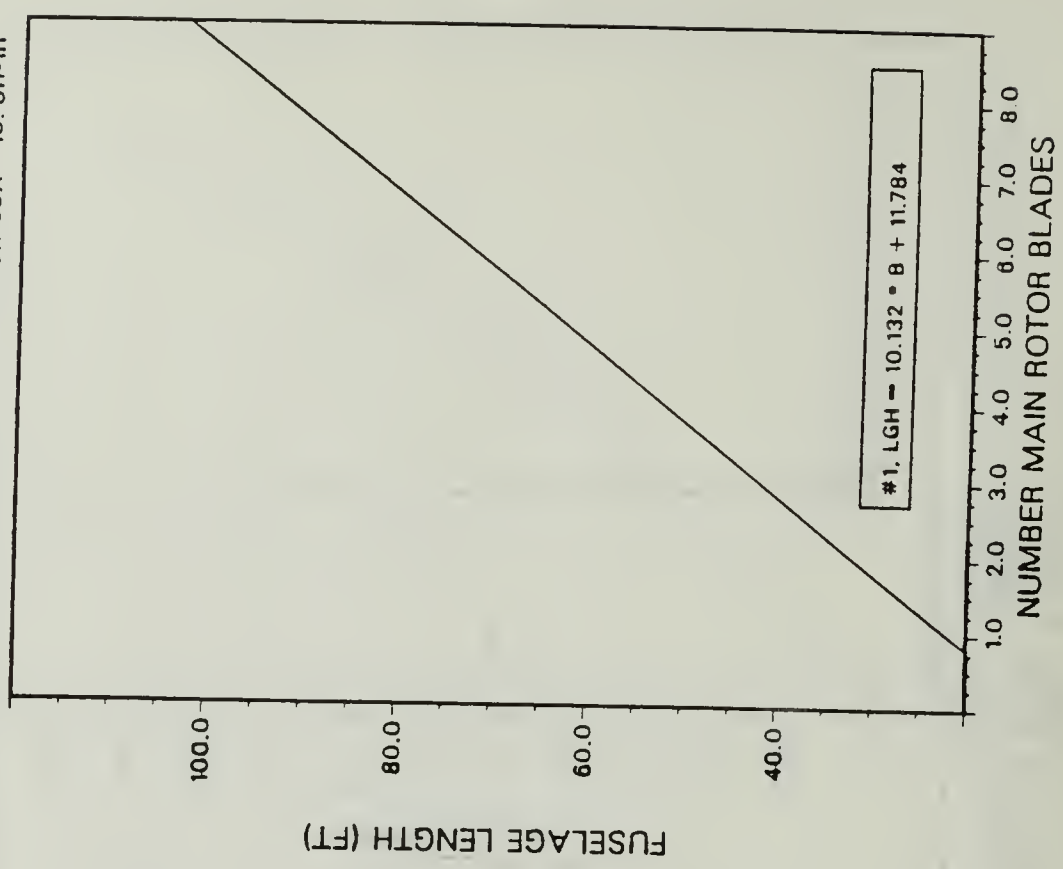


Fig. 3-18b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

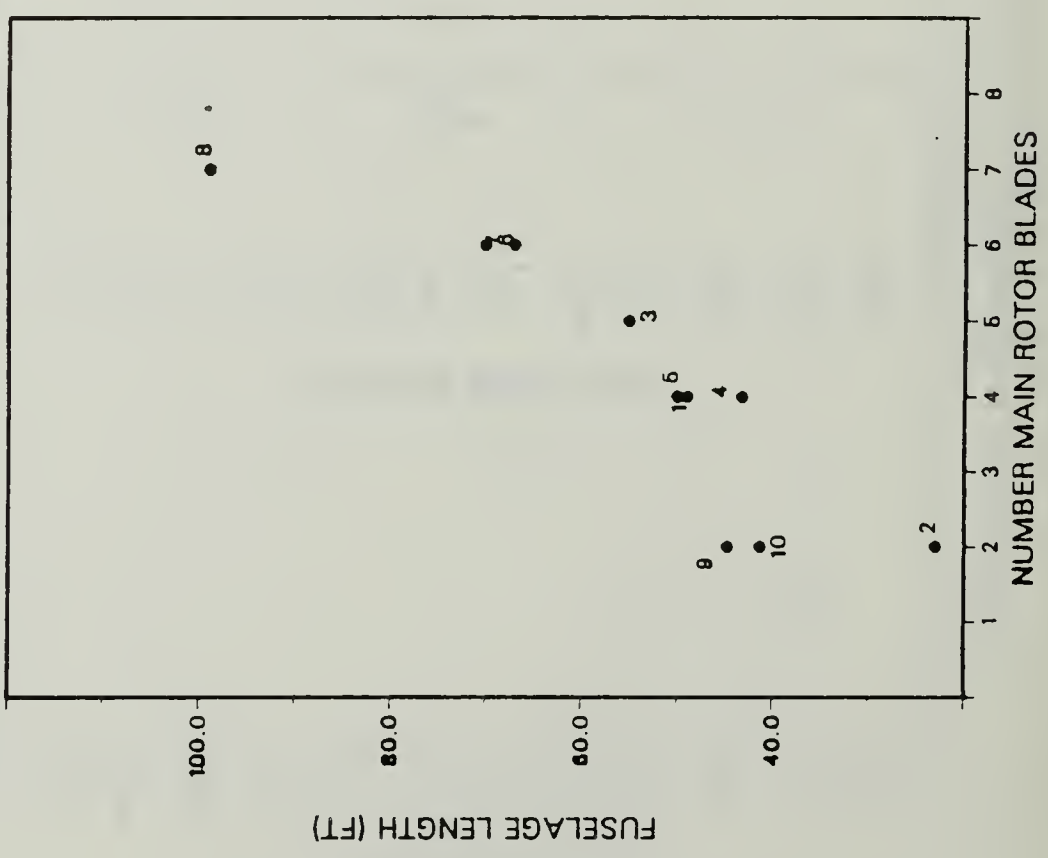


Fig. 3-18a.

Fig. 3-18a and 3-18b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

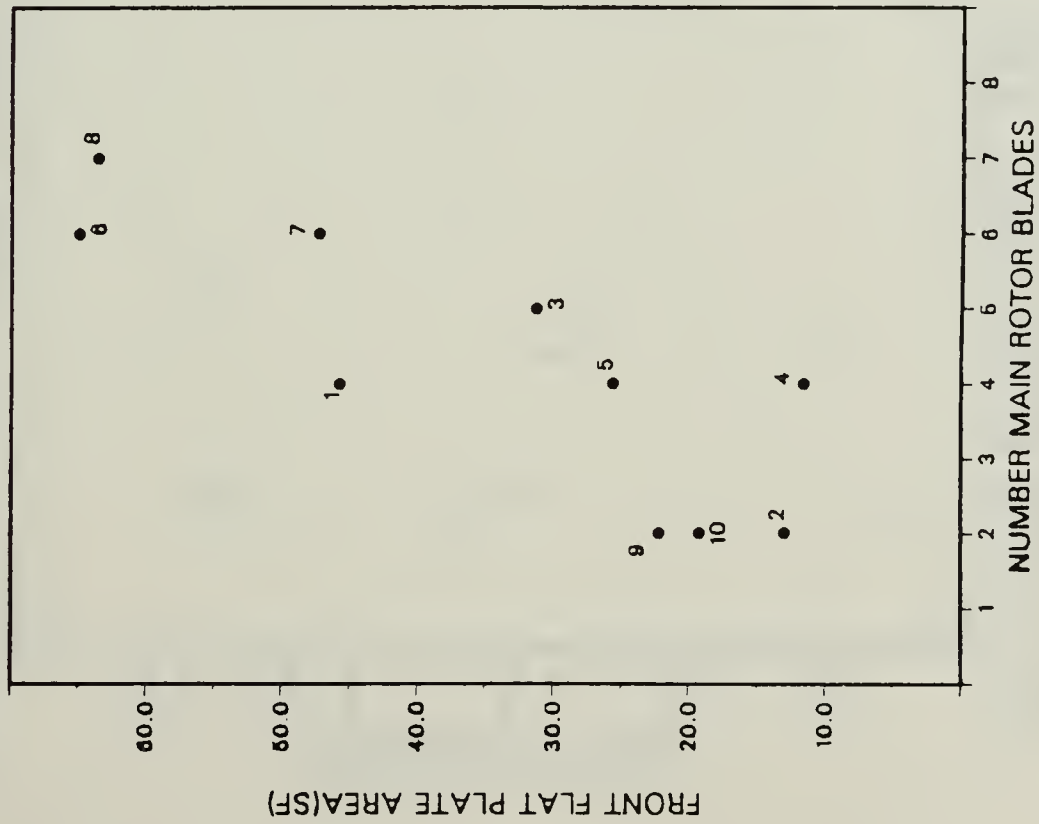


Fig. 3-19a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

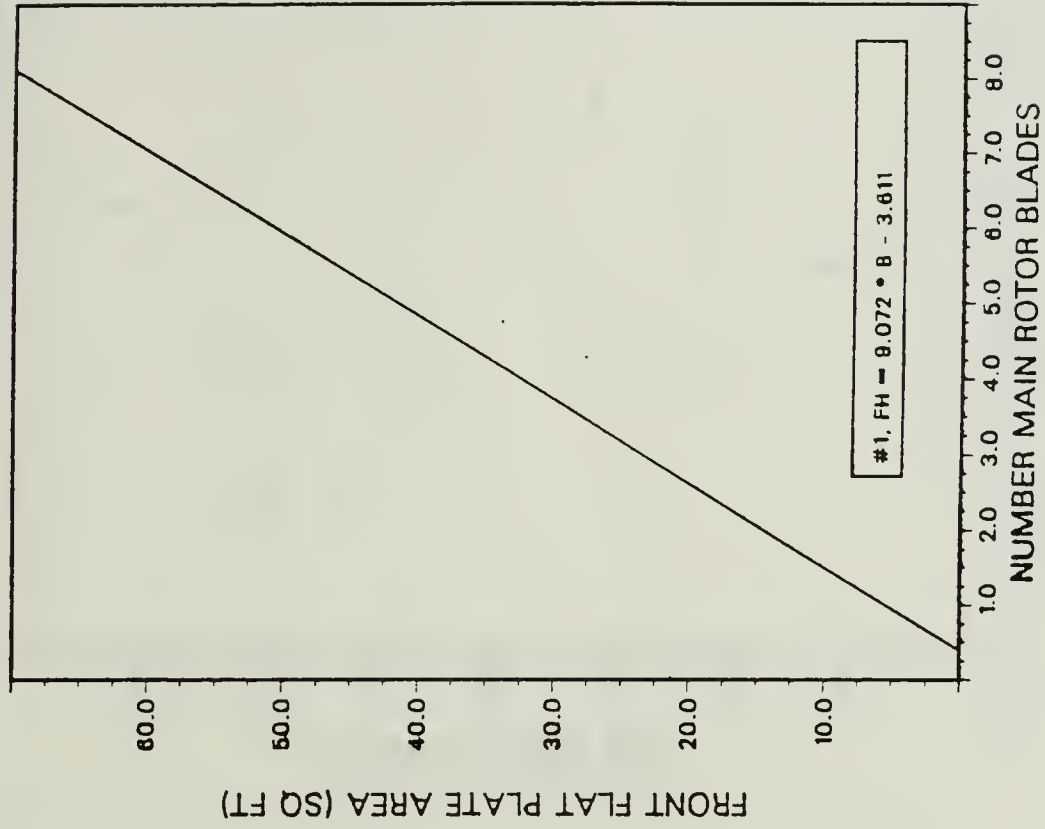


Fig. 3-19b.

Fig. 3-19a and 3-19b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

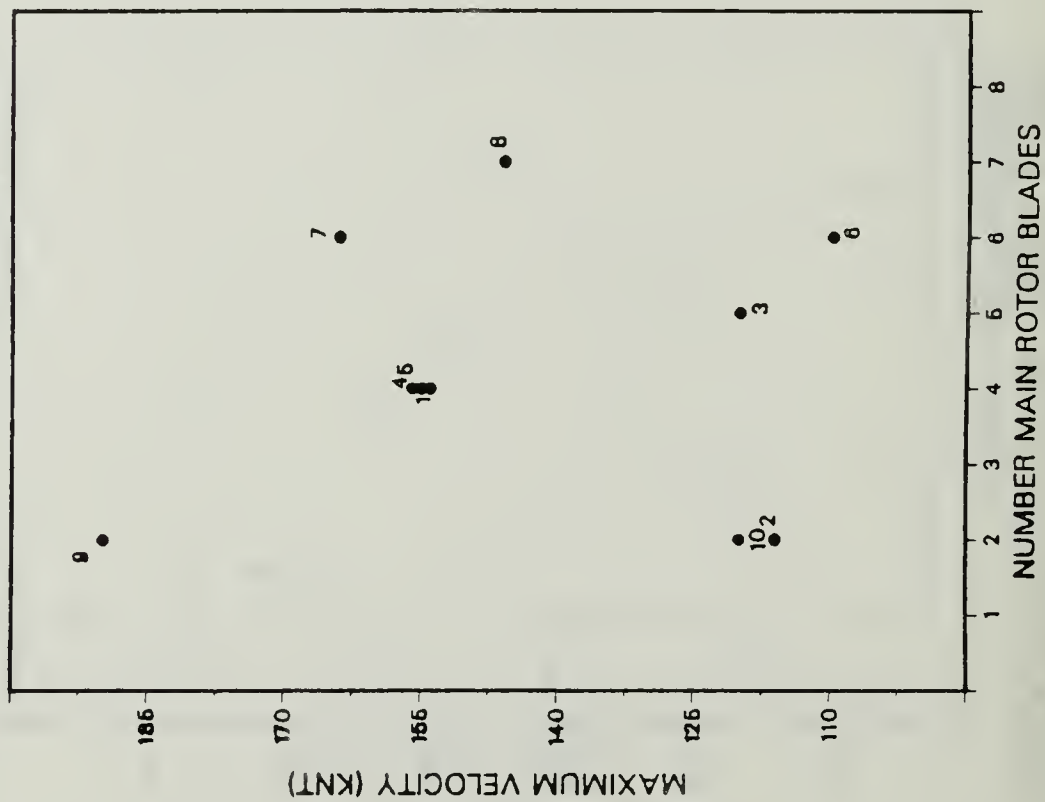


Fig. 3-21.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

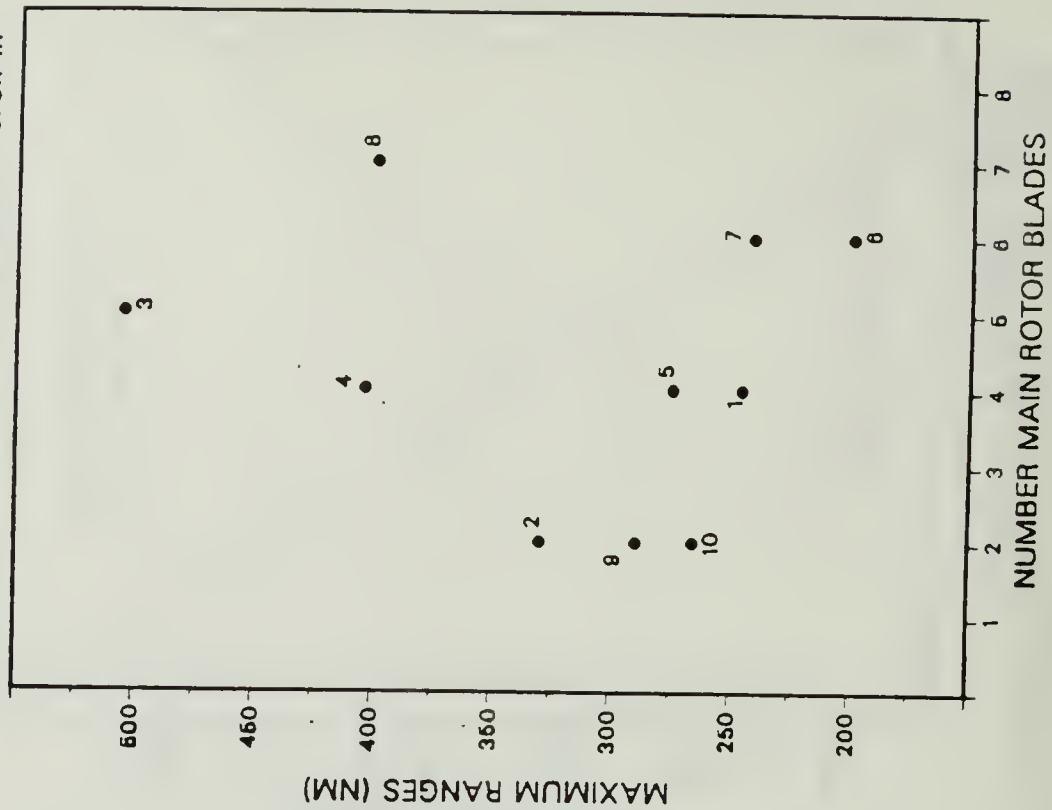


Fig. 3-22.

Fig. 3-21 and 3-22.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

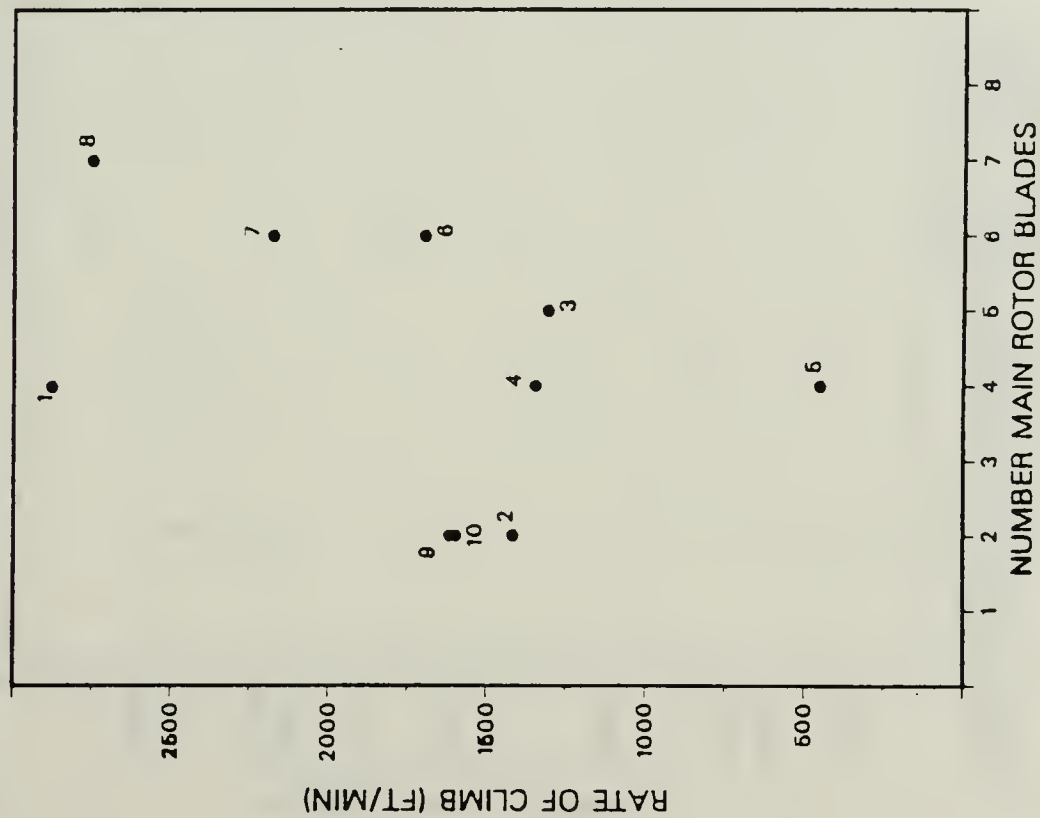


Fig. 3-23.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

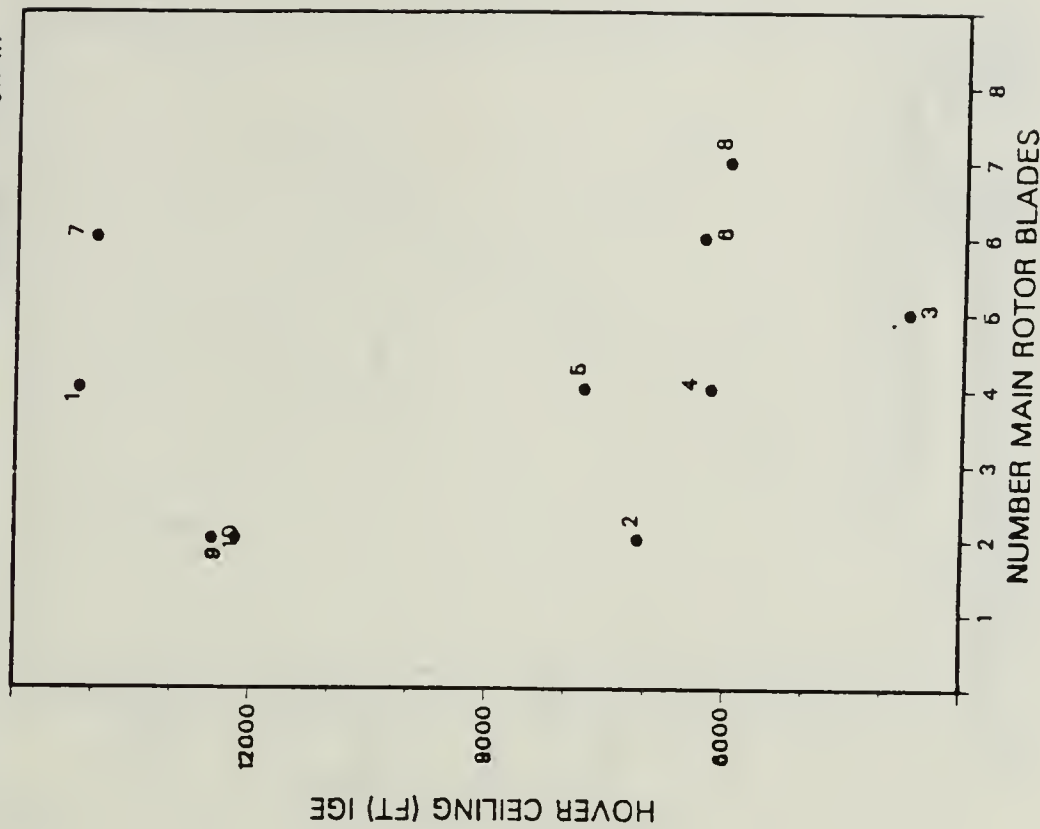


Fig. 3-24.

Fig. 3-23 and 3-24.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

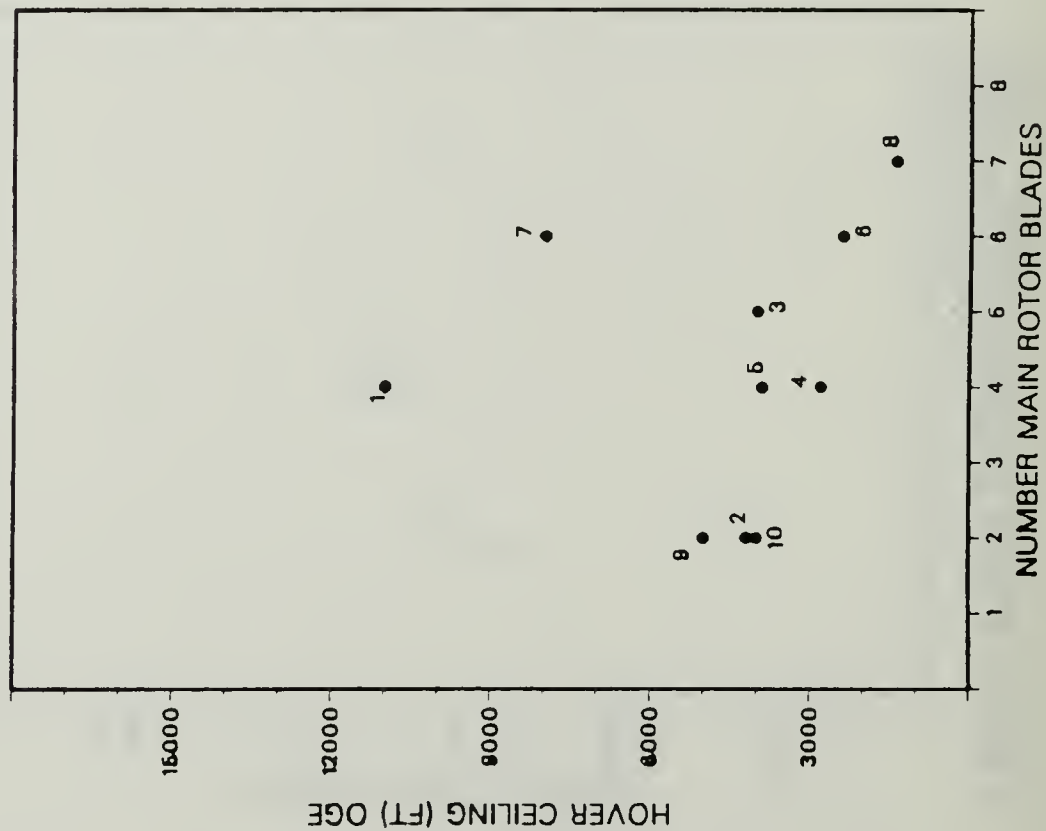


Fig. 3-25.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

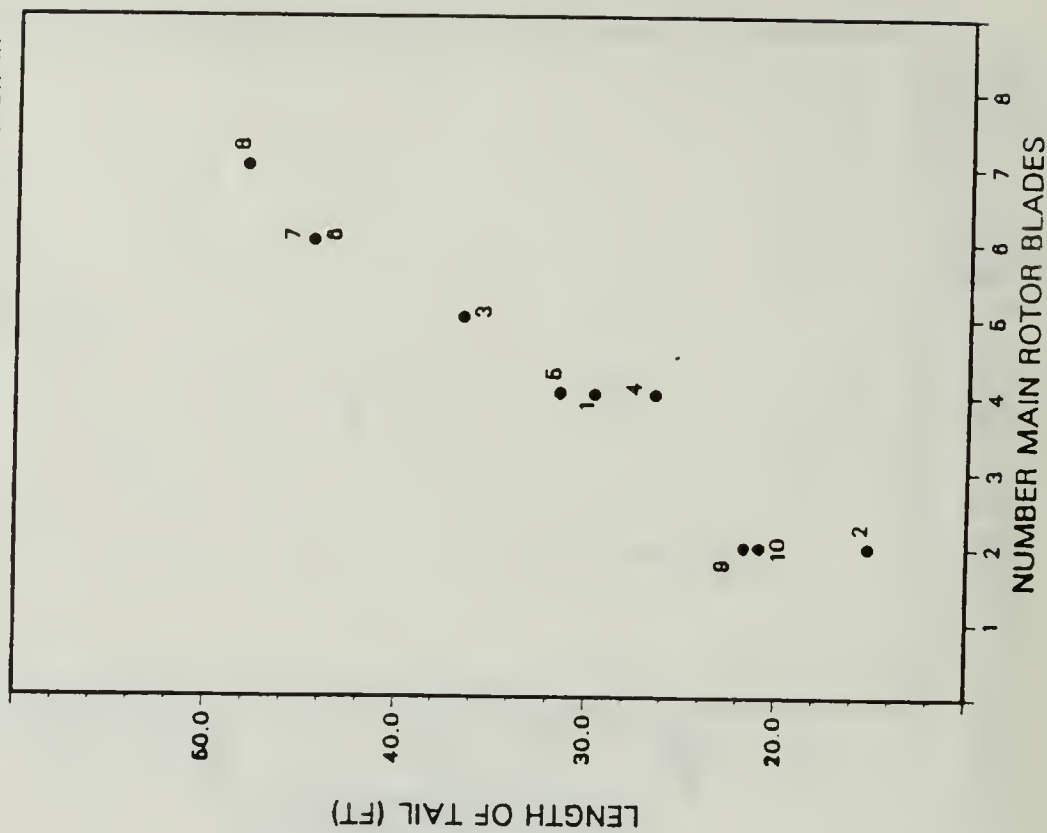


Fig. 3-26.

Fig. 3-25 and 3-26.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

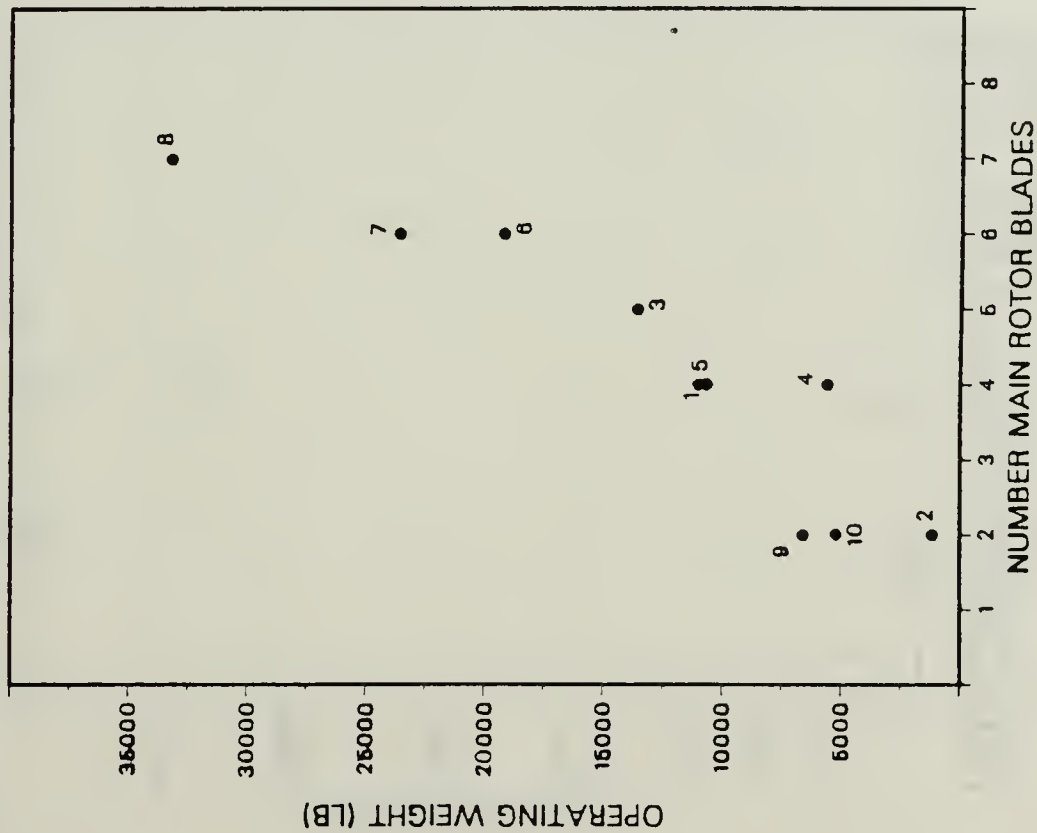


Fig. 3-27a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

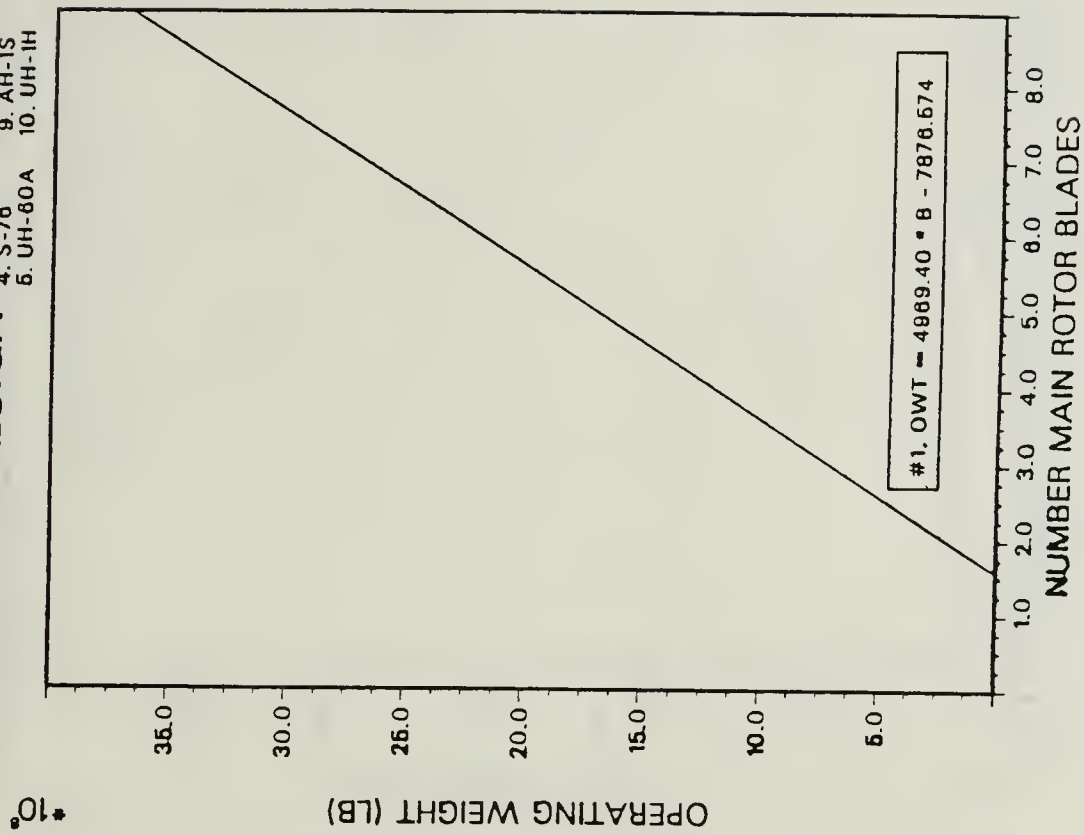


Fig. 3-27b.

Fig. 3-27a and 3-27b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

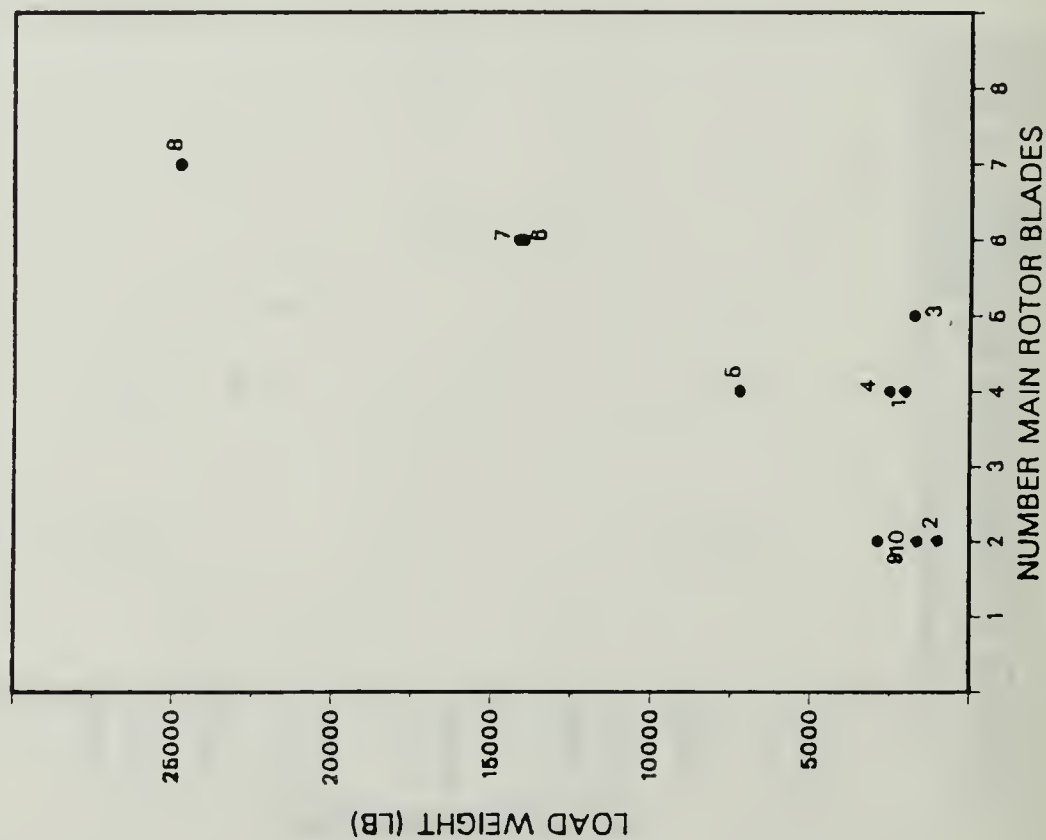


Fig. 3-28a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

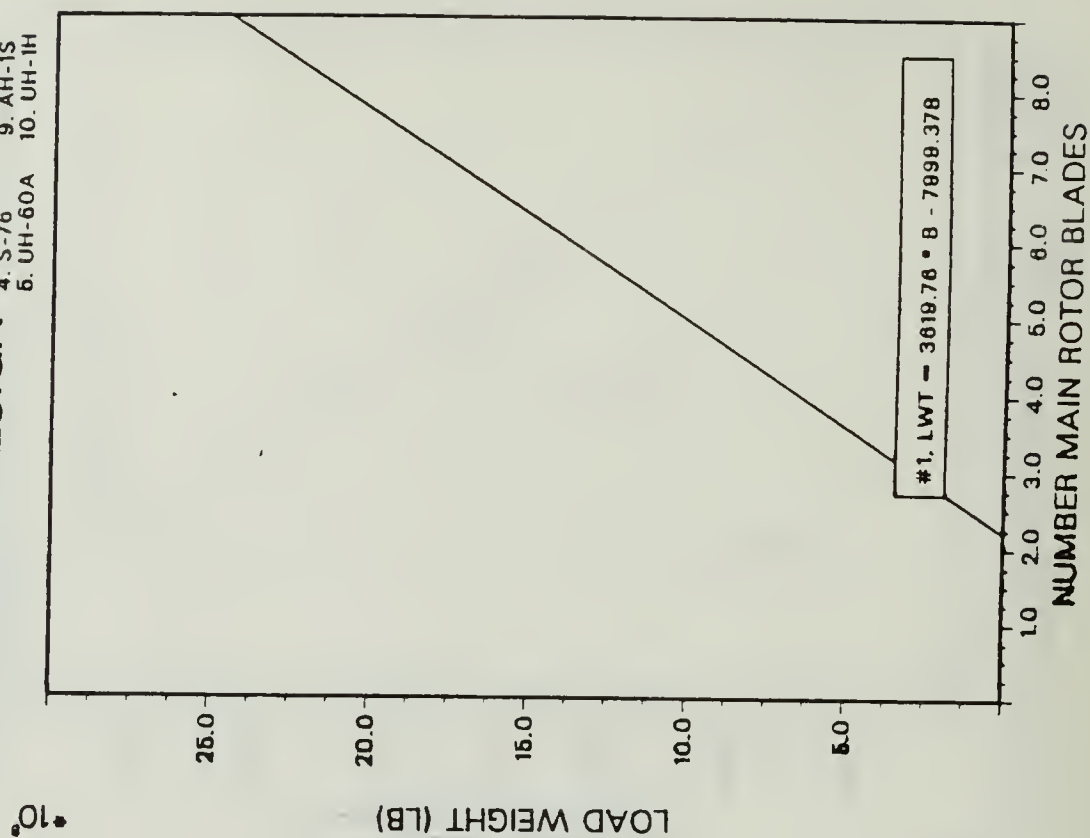


Fig. 3-28b.

Fig. 3-28a and 3-28b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

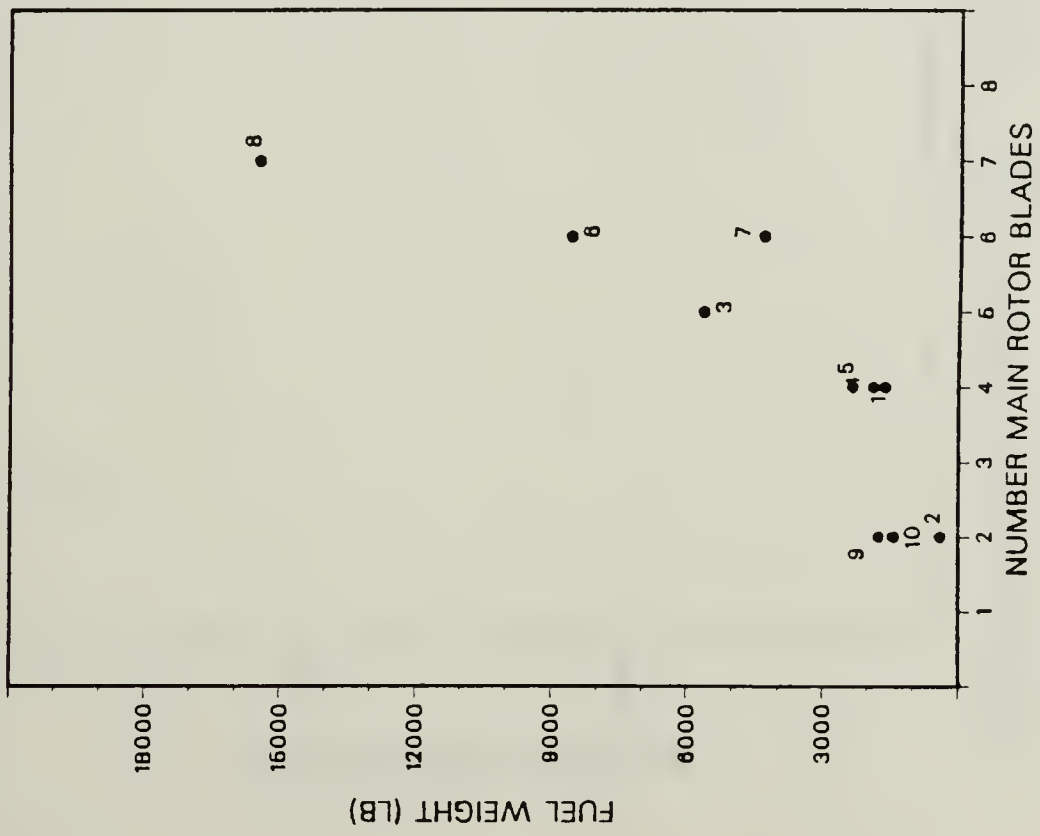


Fig. 3-29a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

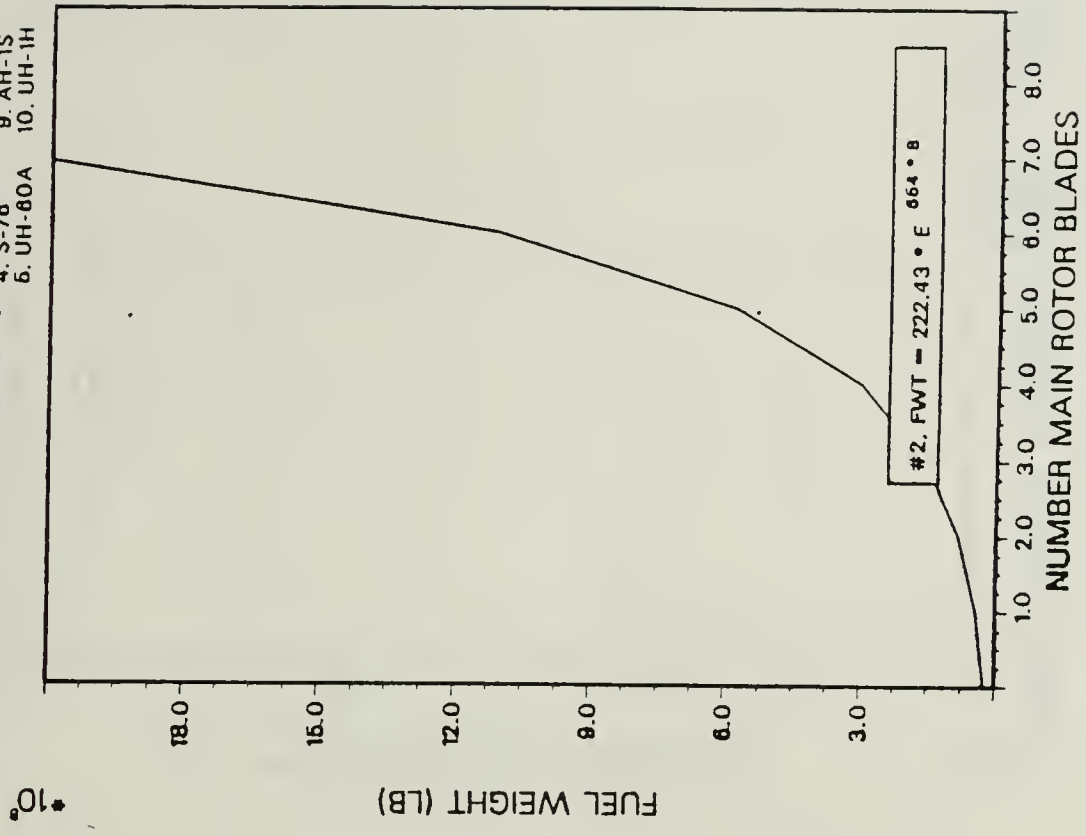


Fig. 3-29b.

Fig. 3-29a and 3-29b.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

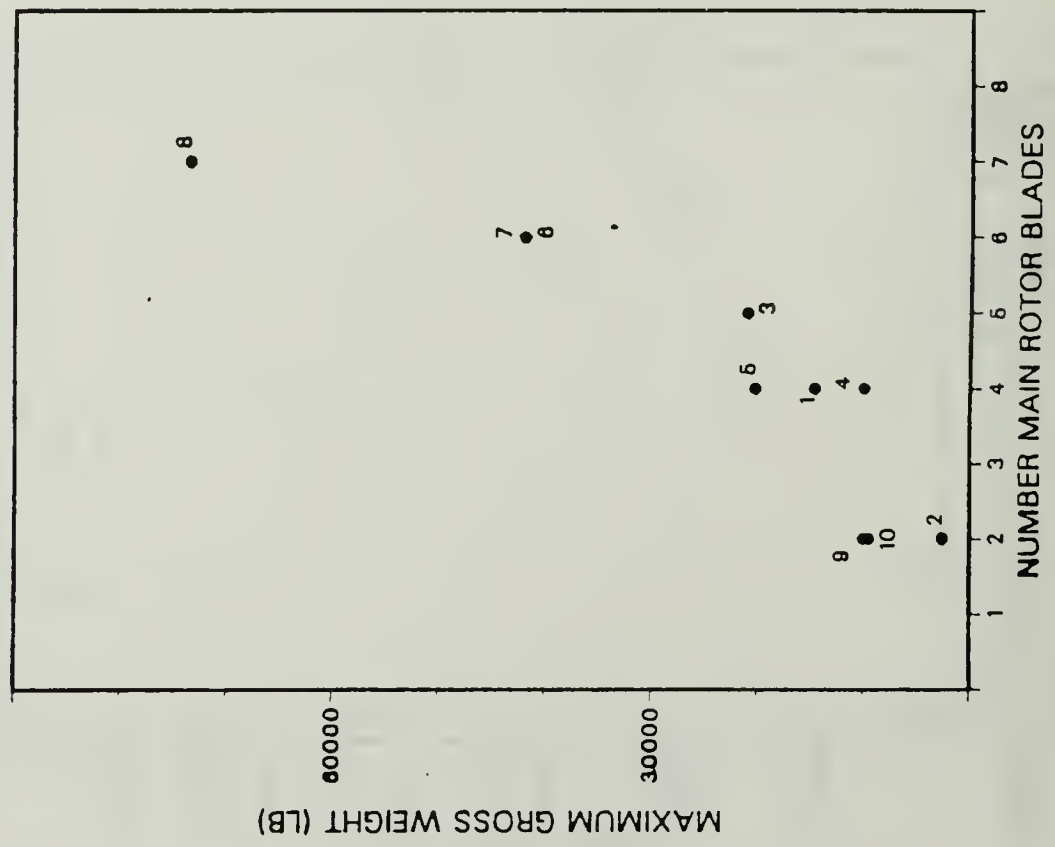


Fig. 3-30a.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

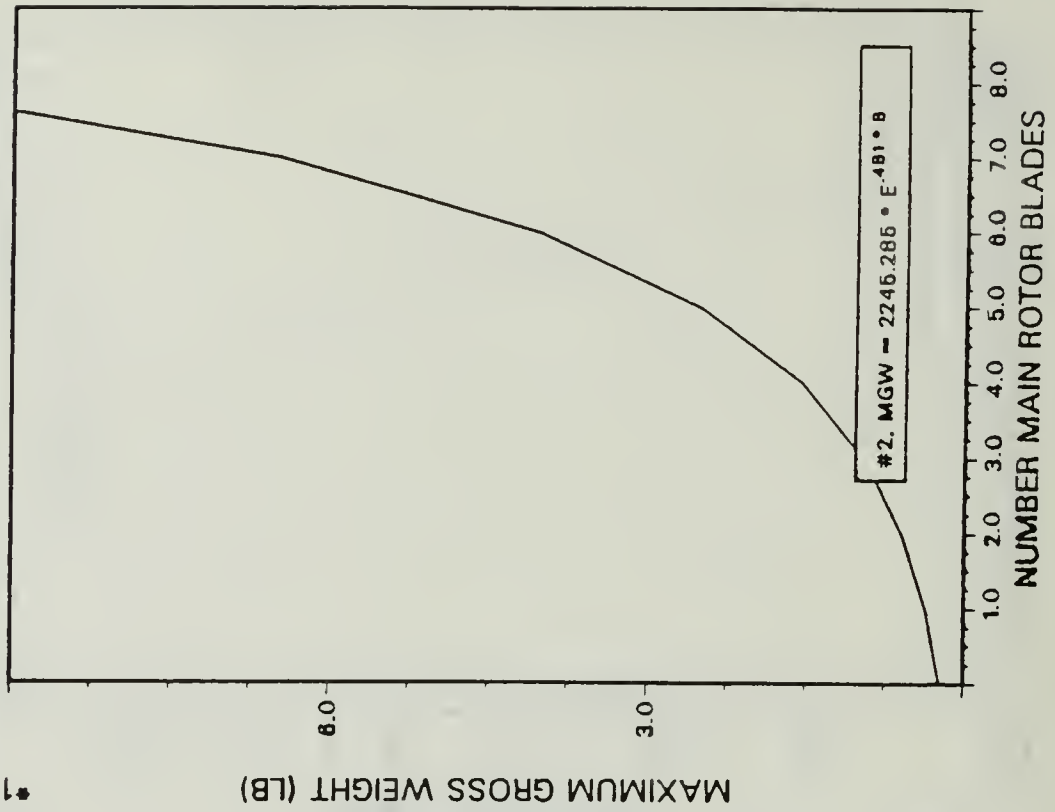


Fig. 3-30b.

Fig. 3-30a and 3-30b.

Number of Tail Rotor Blades Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

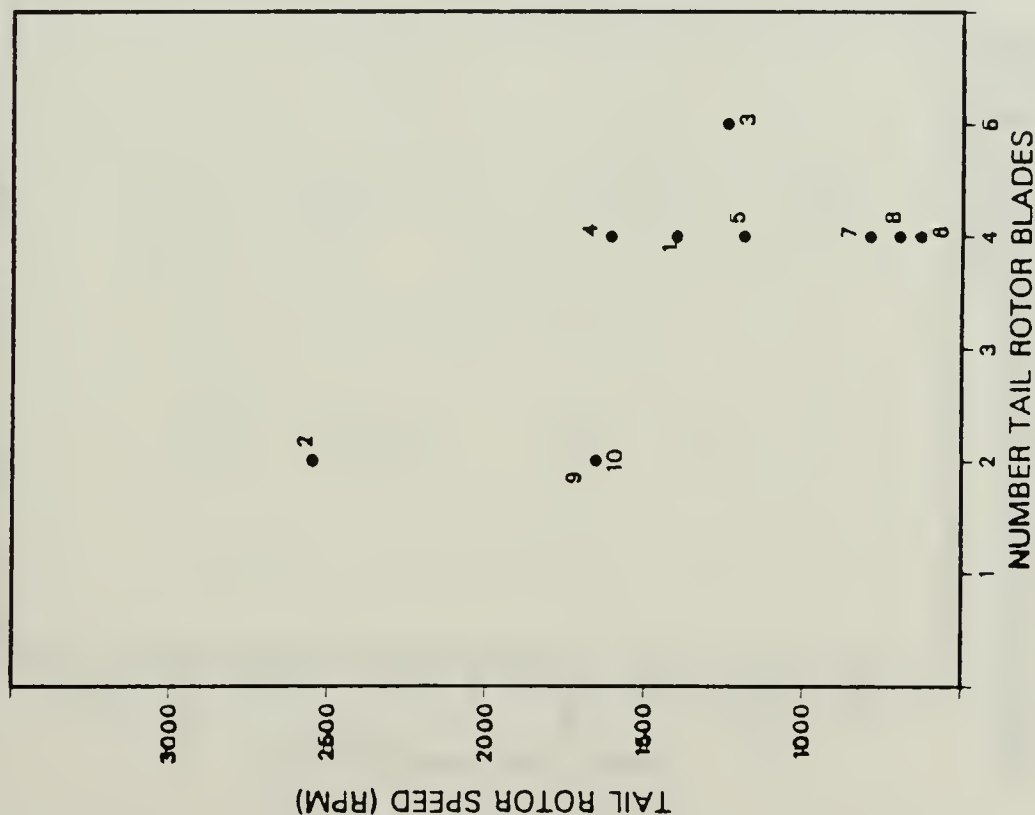


Fig. 4-7.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

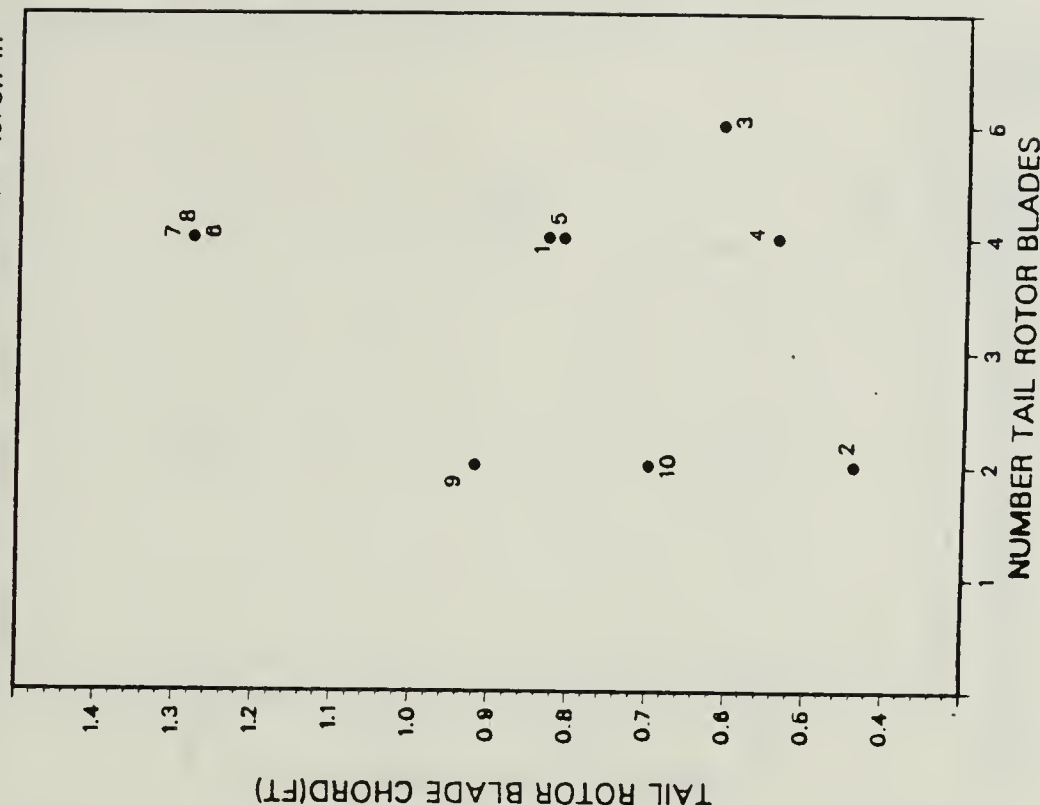


Fig. 4-9.

Fig. 4-7 and 4-9.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

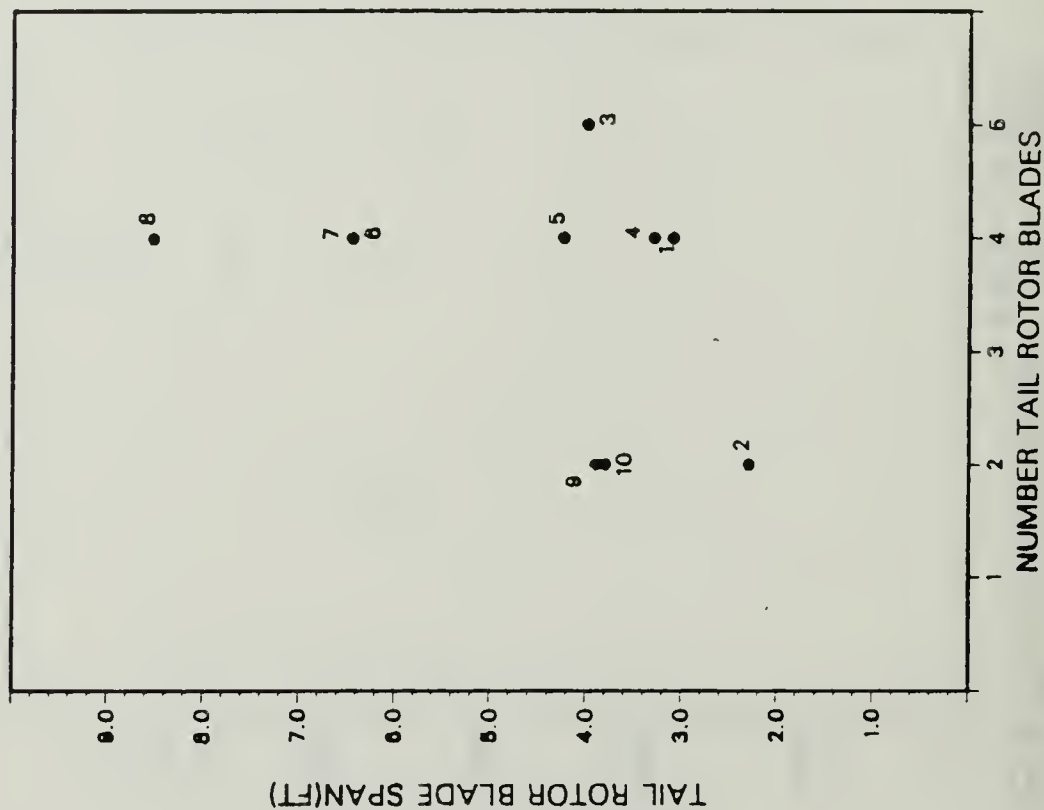


Fig. 4-11.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

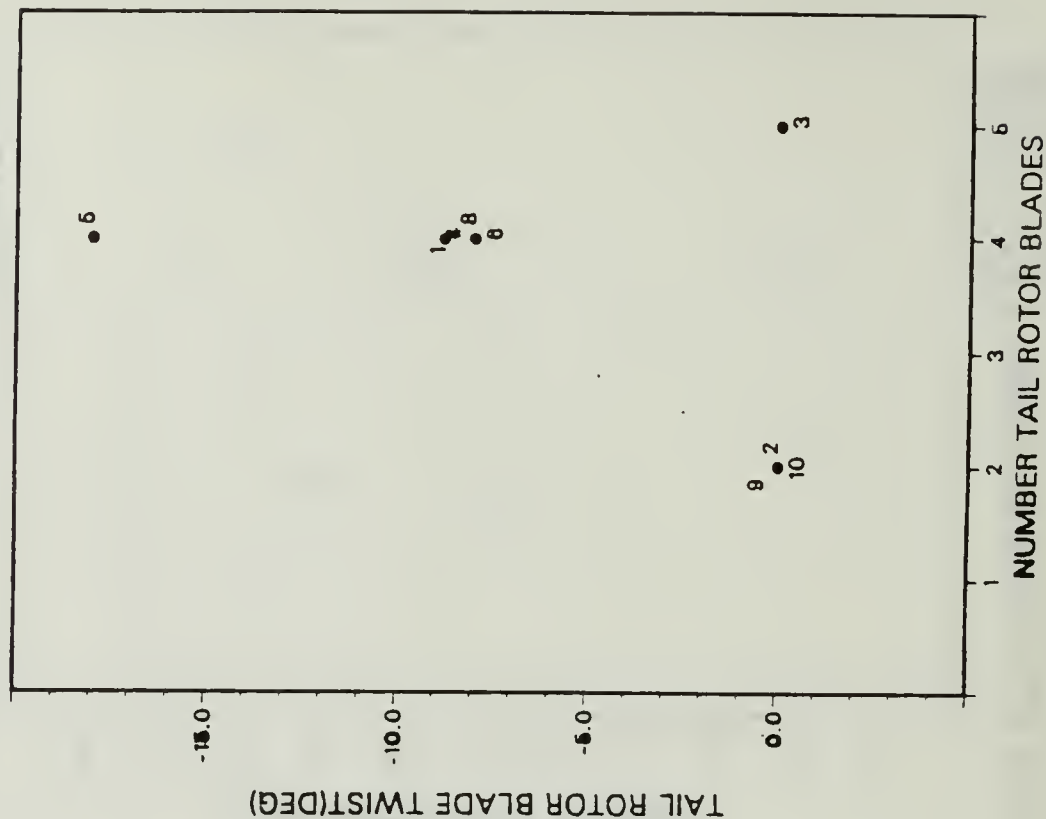


Fig. 4-13.

Fig. 4-11 and 4-13.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

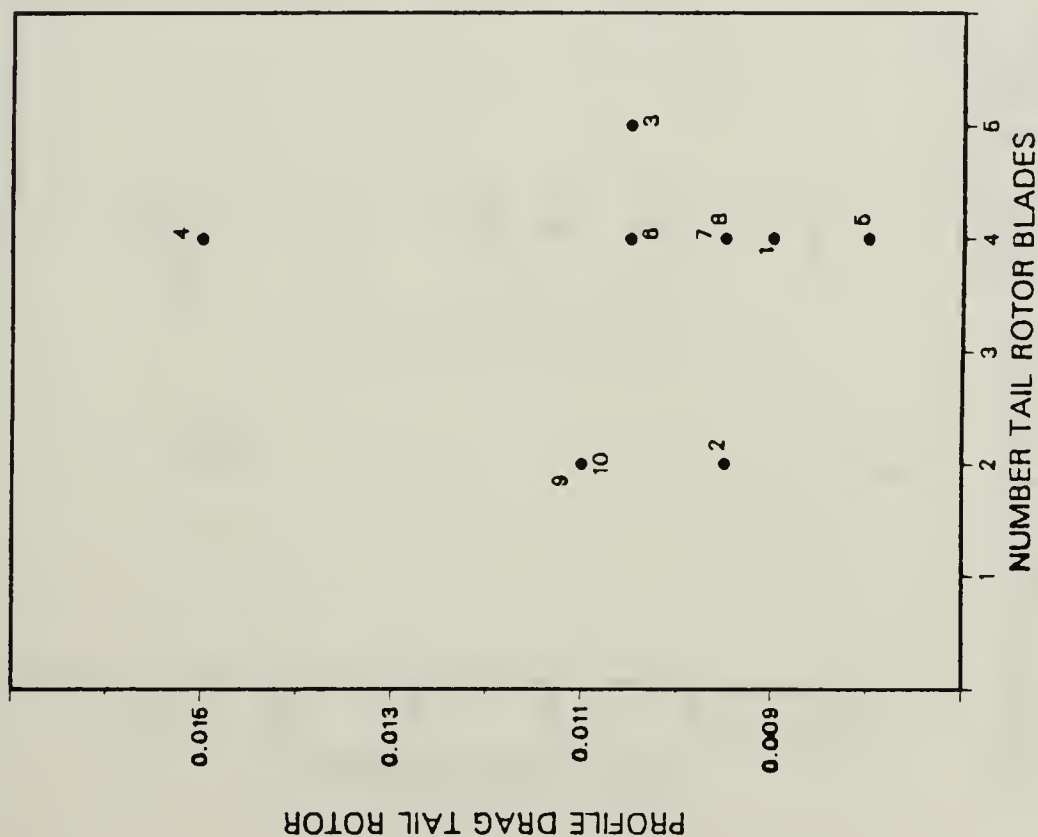


Fig. 4-15.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

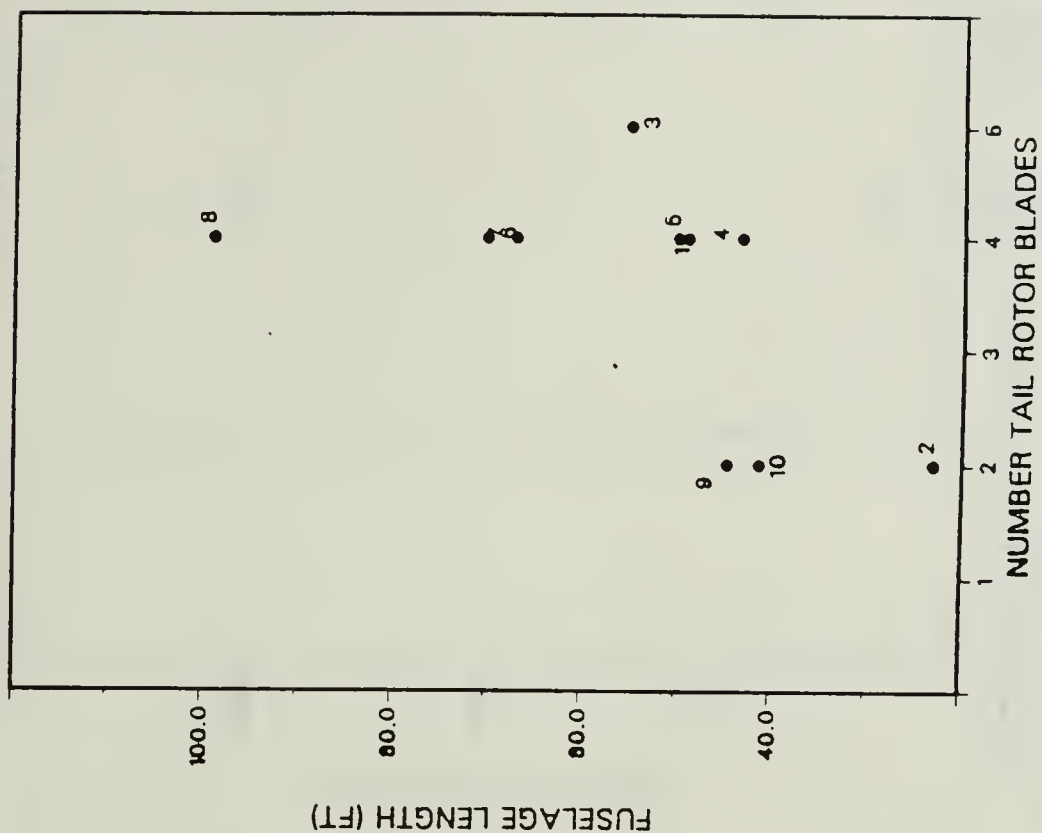


Fig. 4-18.

Fig. 4-15 and 4-18.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

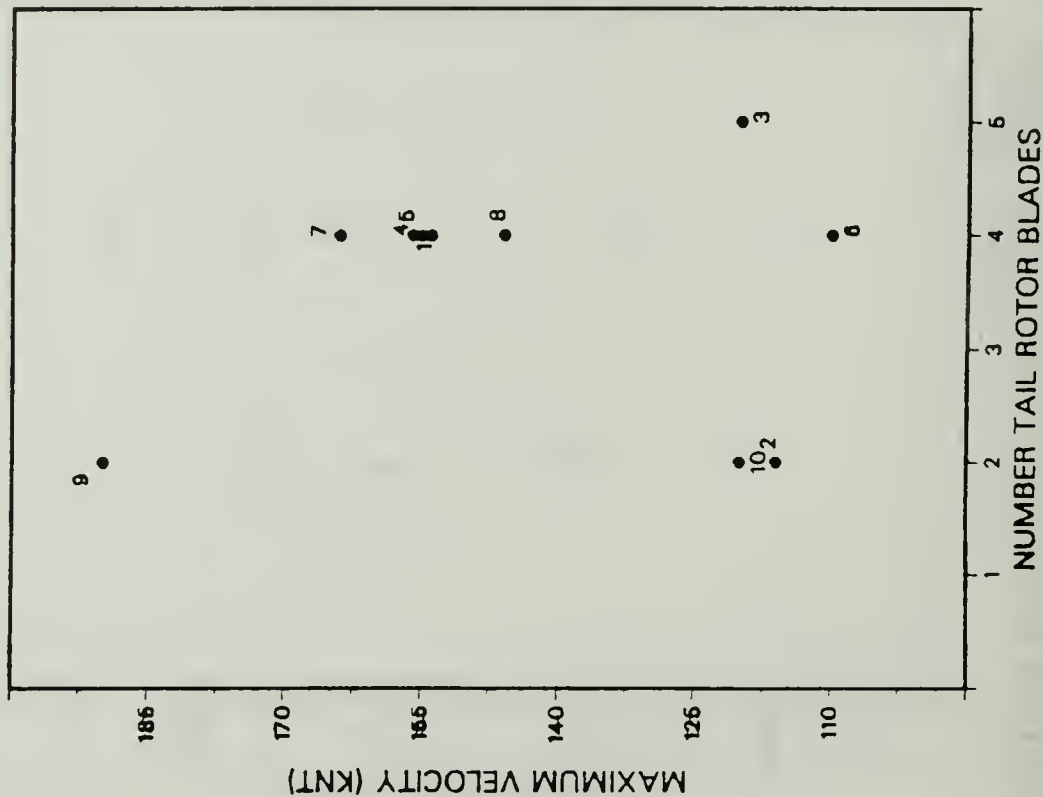


Fig. 4-21.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

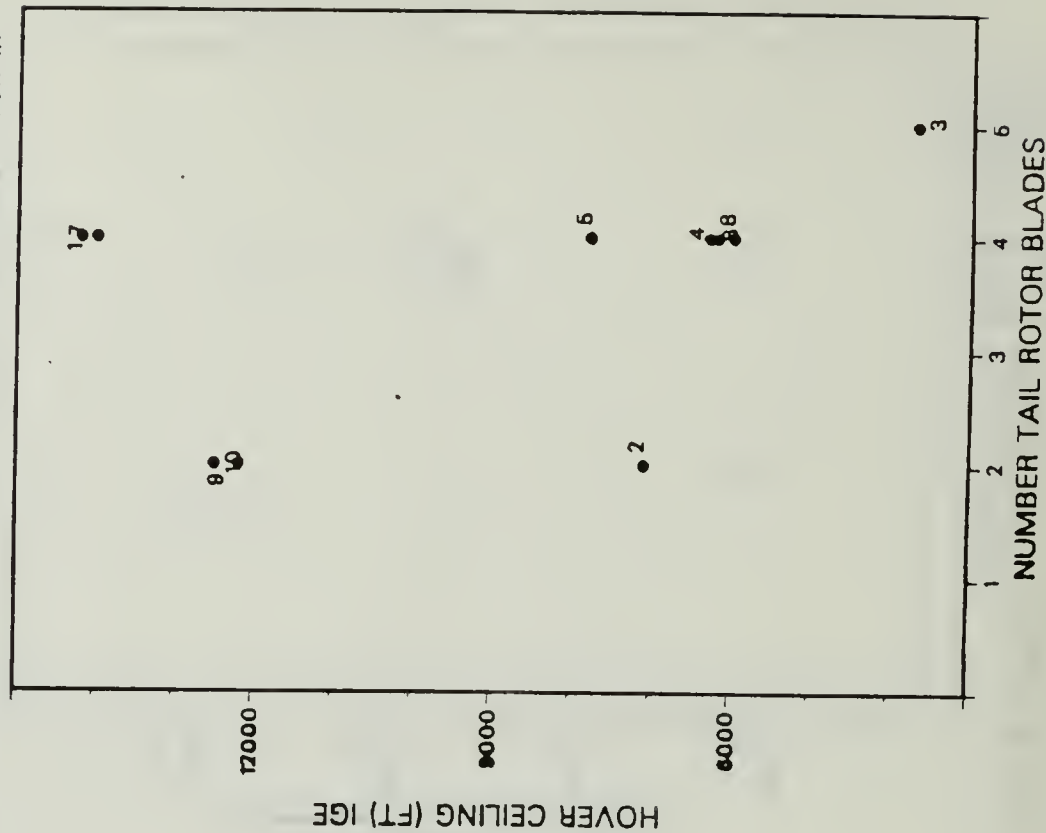


Fig. 4-24.

Fig. 4-21 and 4-24.

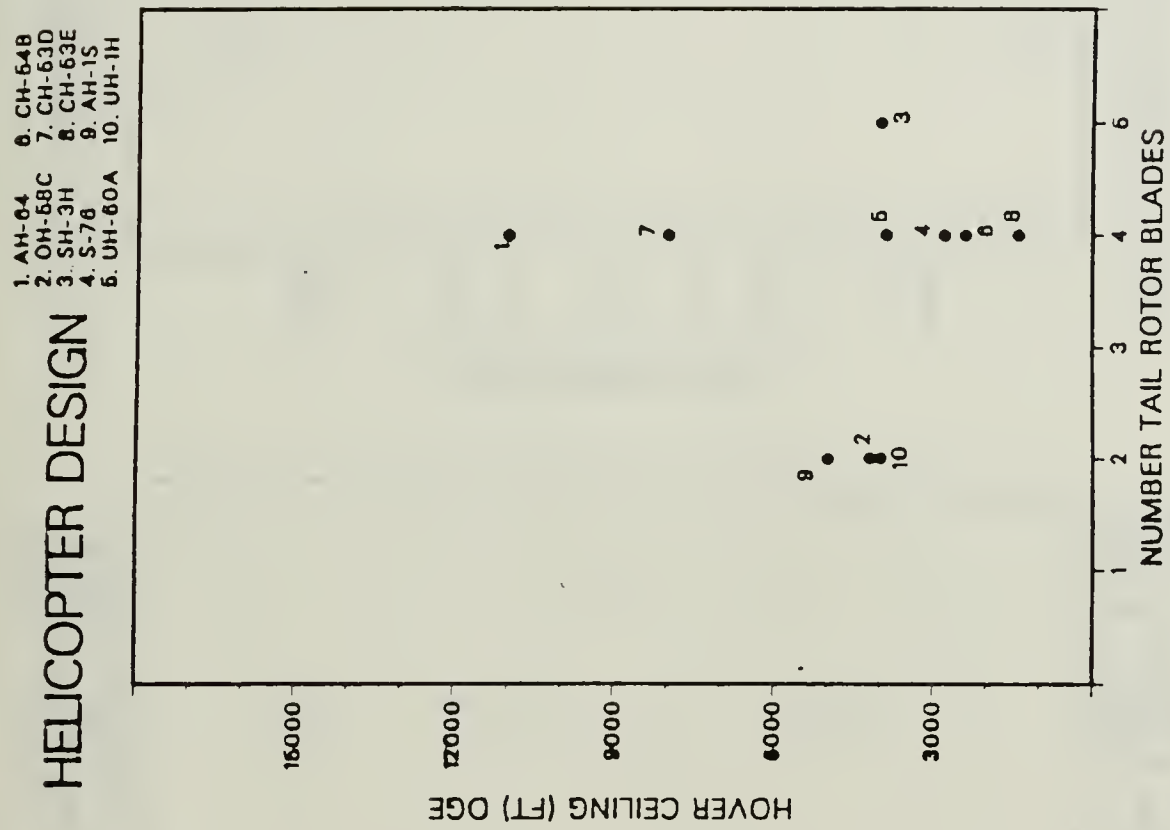


Fig. 4-25.

Fig. 4-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

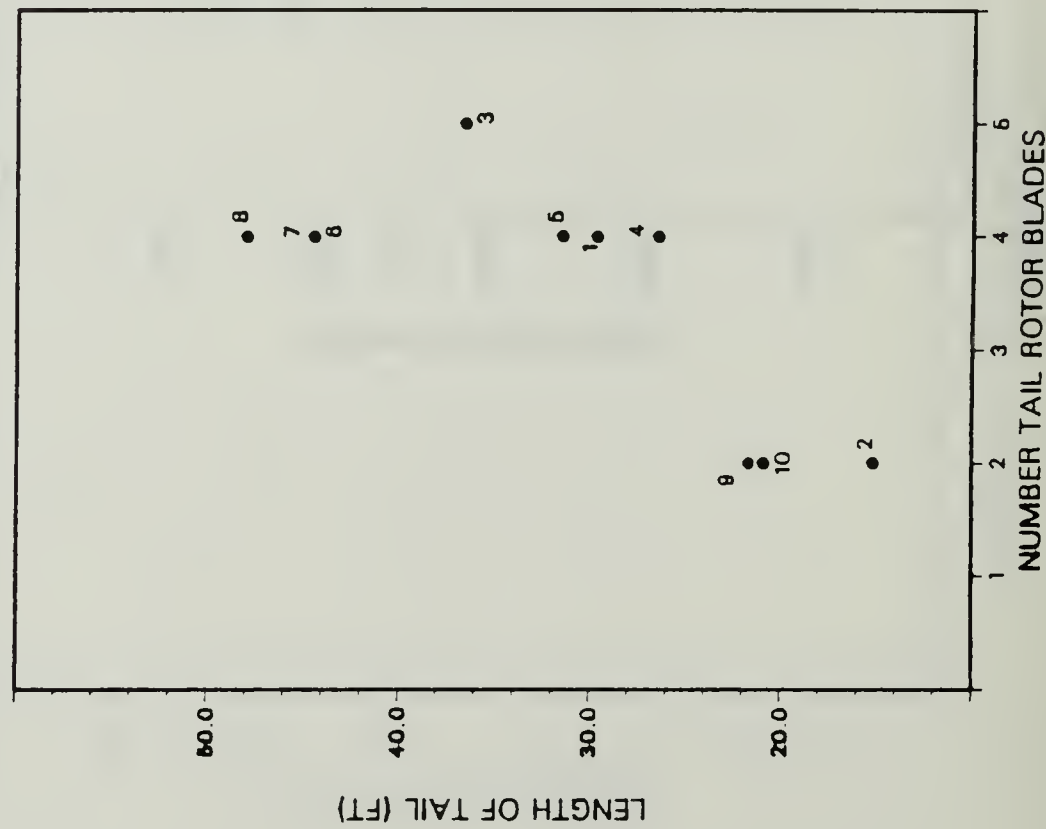


Fig. 4-26a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

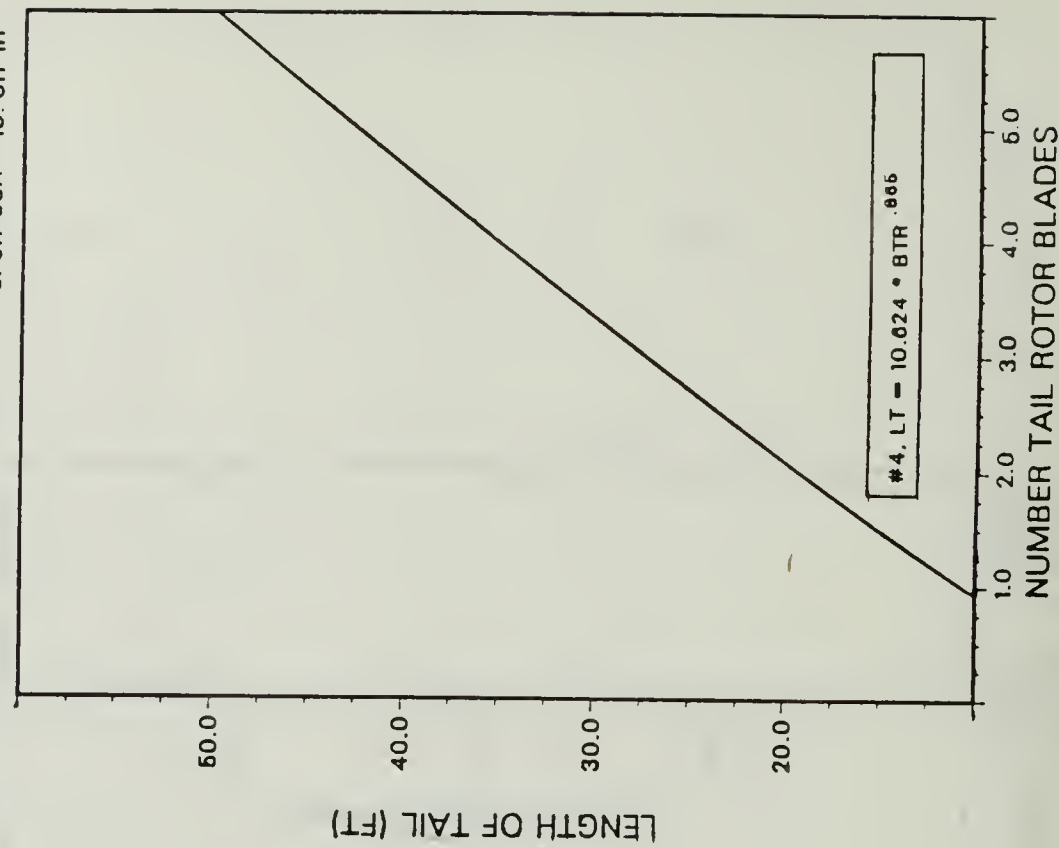


Fig. 4-26b.

Fig. 4-26a and 4-26b.

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

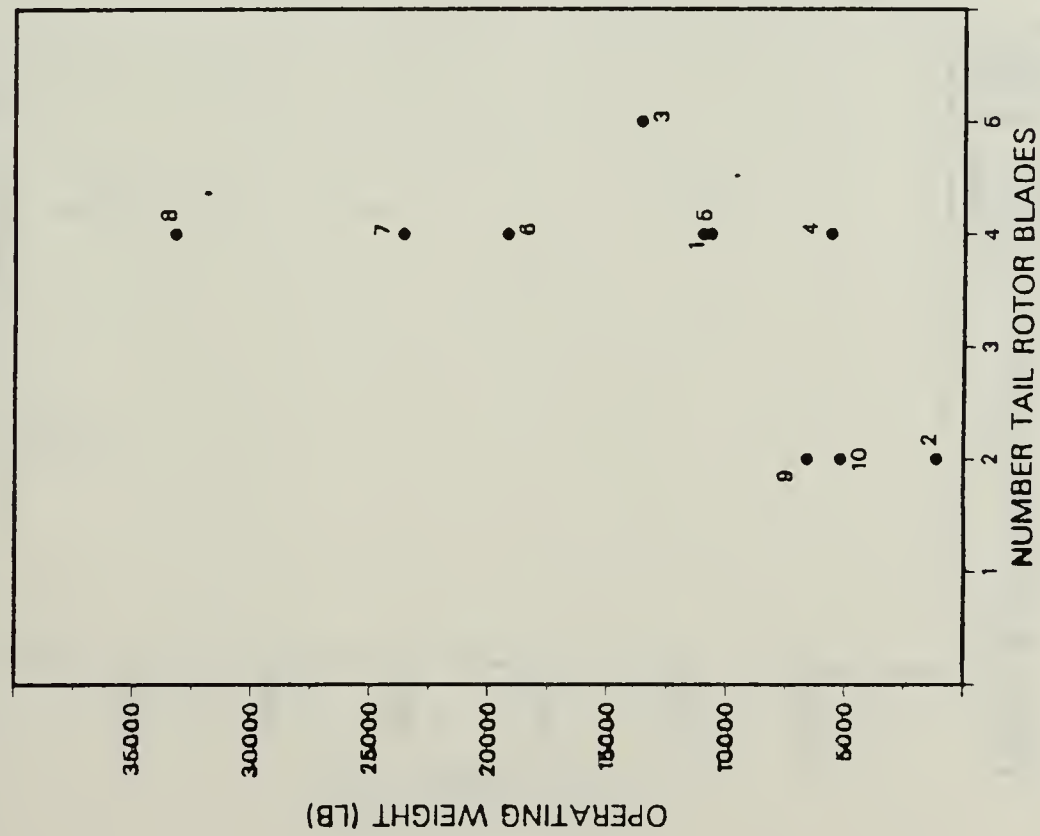


Fig. 4-27

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

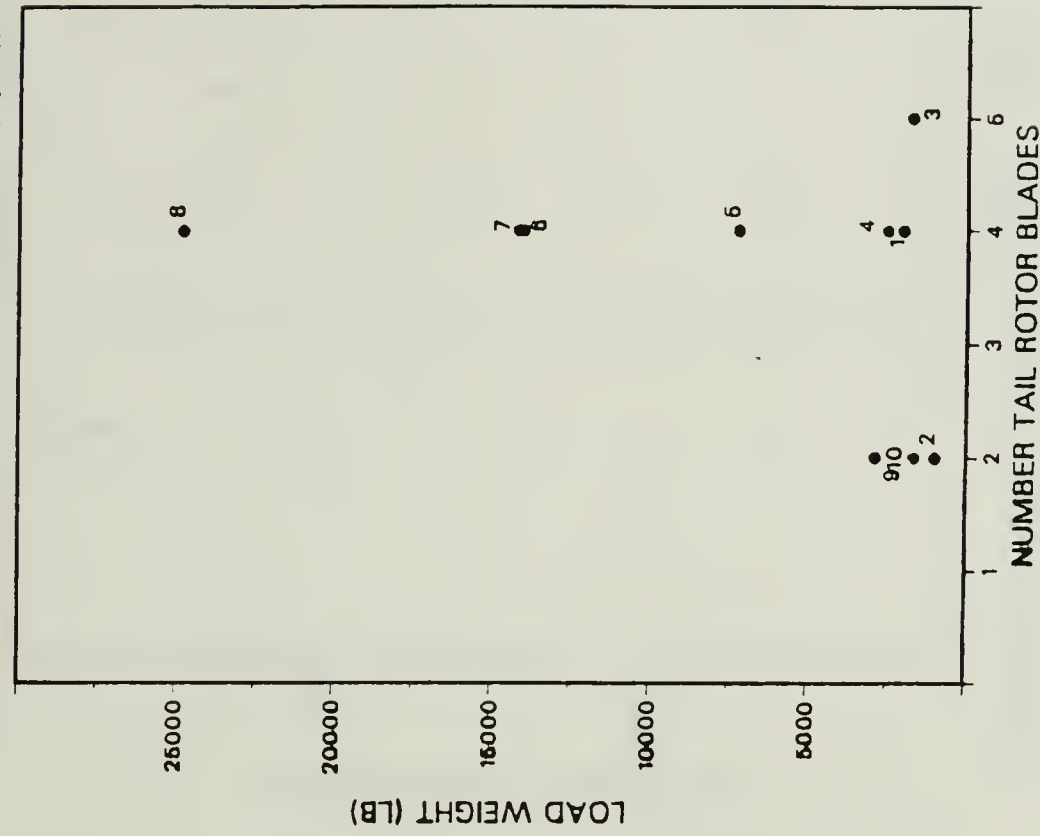


Fig. 4-28

Fig. 4-27 and 4-28.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

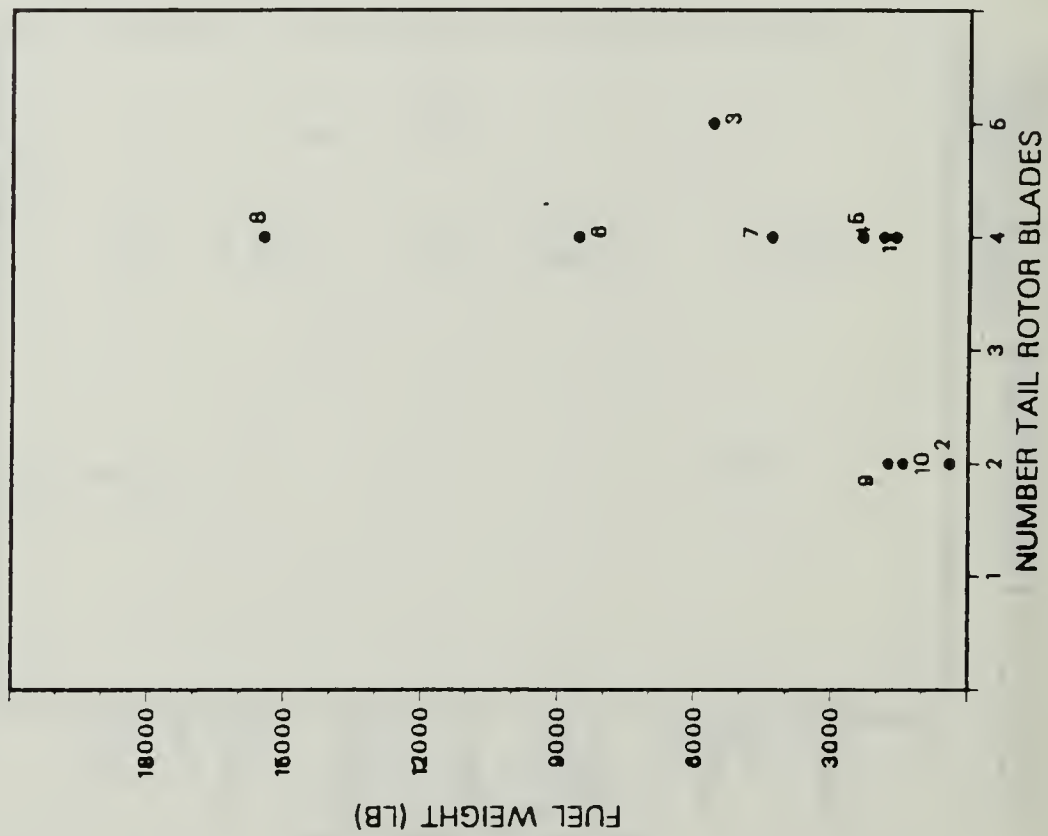


Fig. 4-29.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

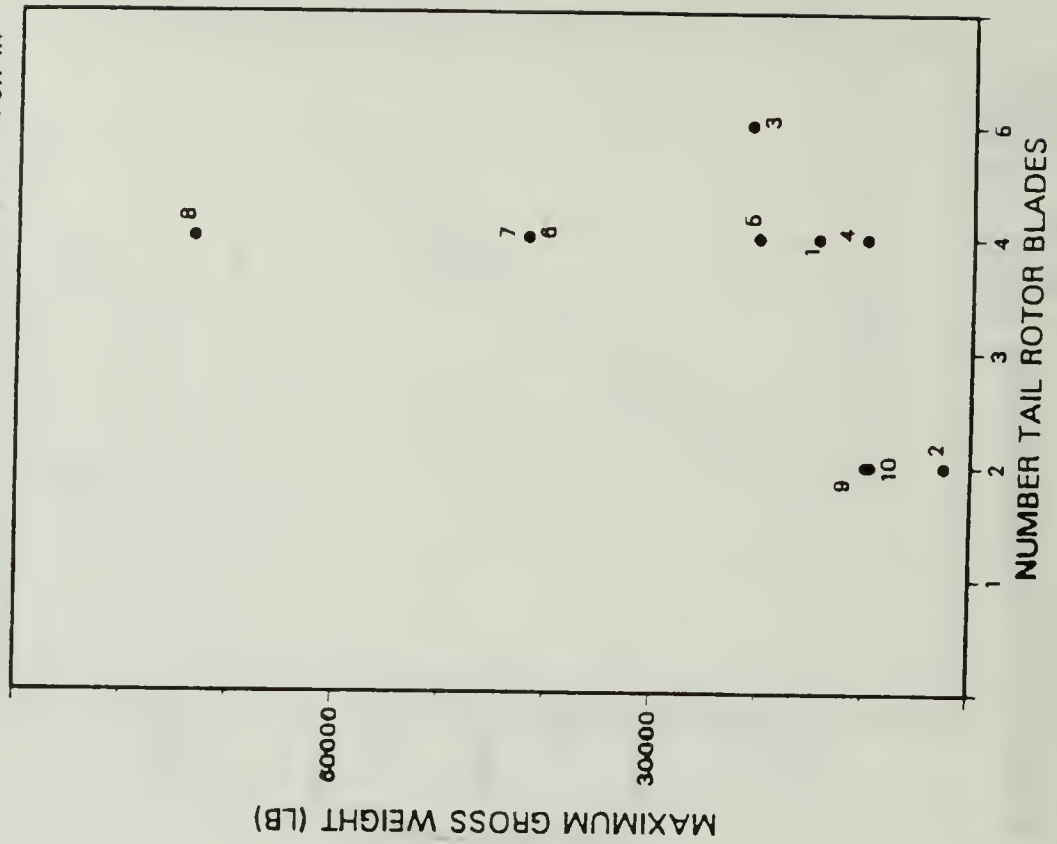


Fig. 4-30.

Fig. 4-29 and 4-30.

Height of Main Rotor System Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

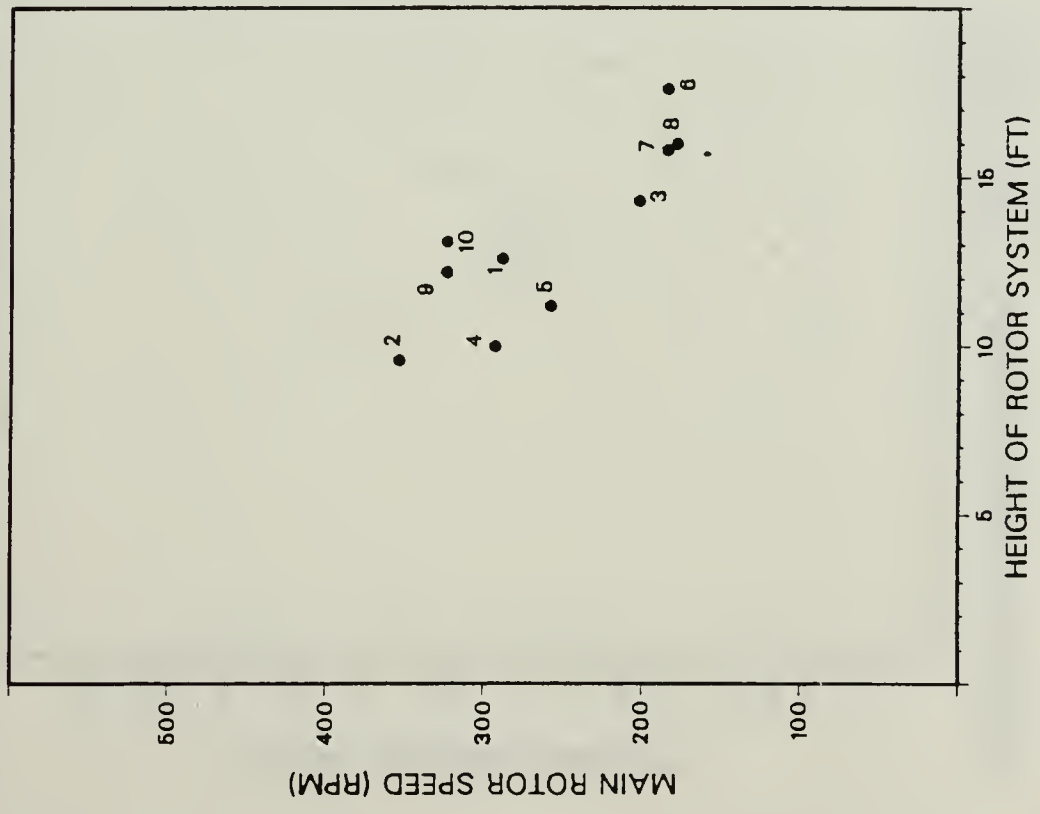


Fig. 5-6a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

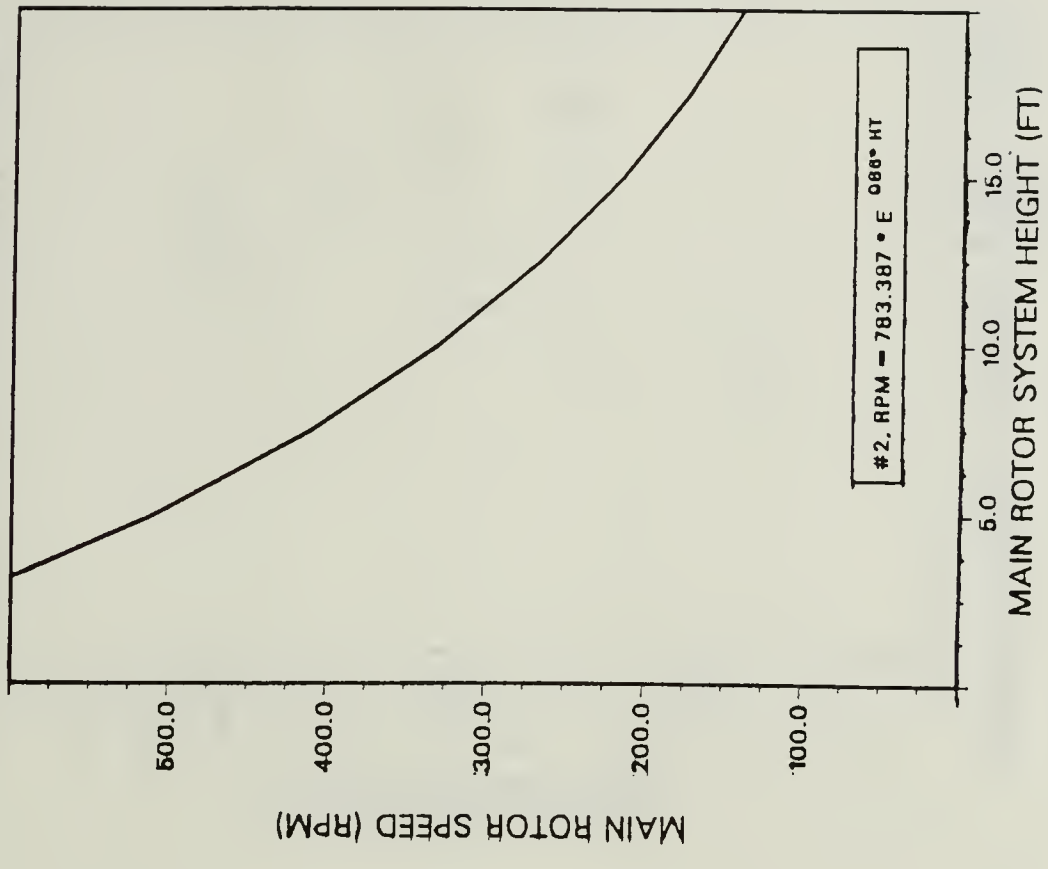


Fig. 5-6b.

Fig. 5-6a and 5-6b.

HELICOPTER DESIGN

- 1. AH-84
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

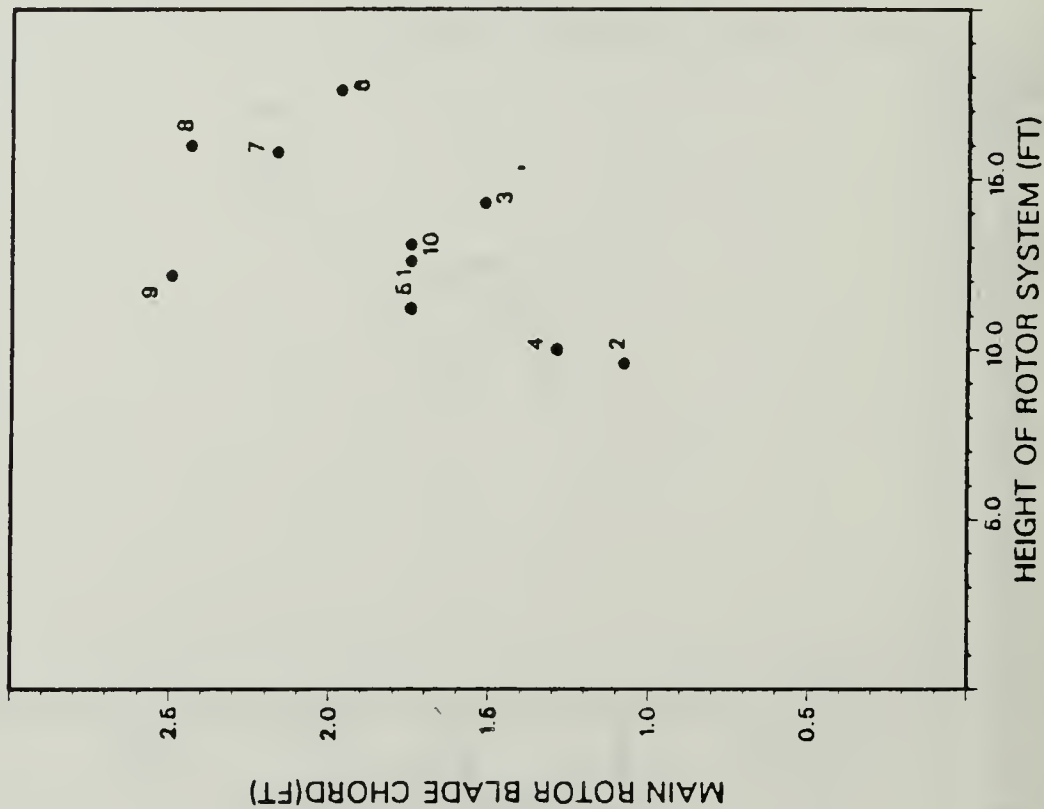


Fig. 5-8.

HELICOPTER DESIGN

- 1. AH-84
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

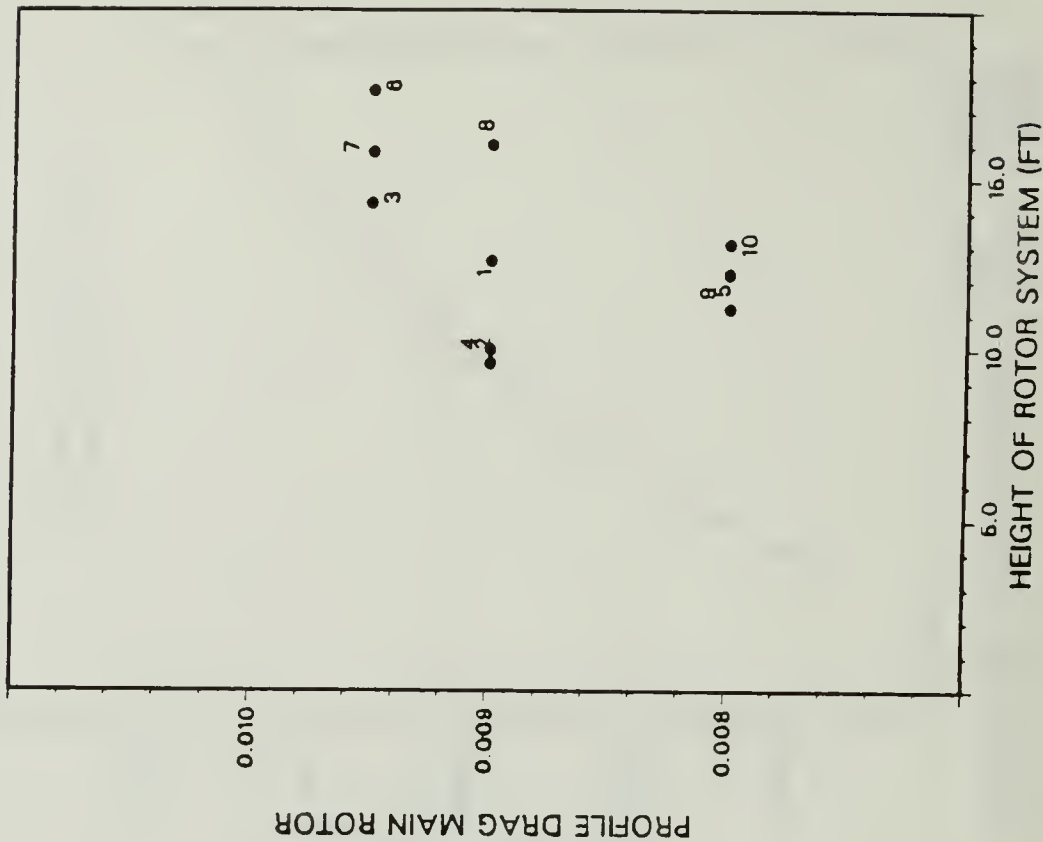


Fig. 5-14.

Fig. 5-8 and 5-14.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

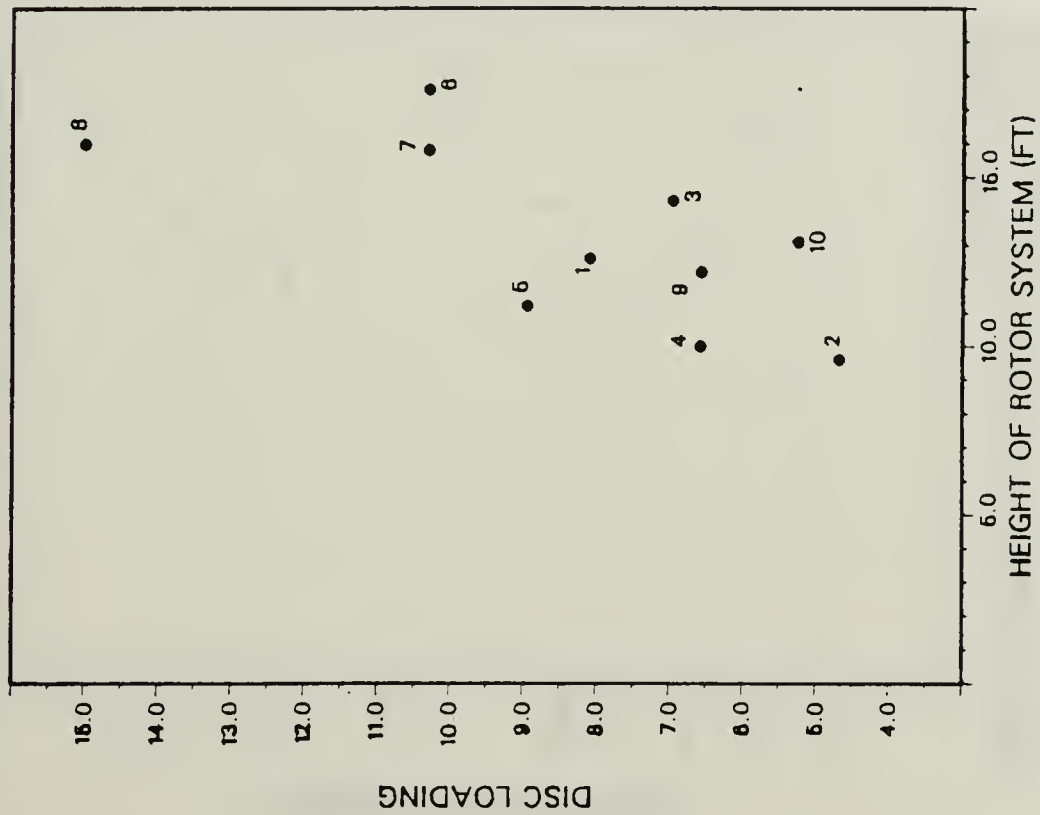


Fig. 5-16.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

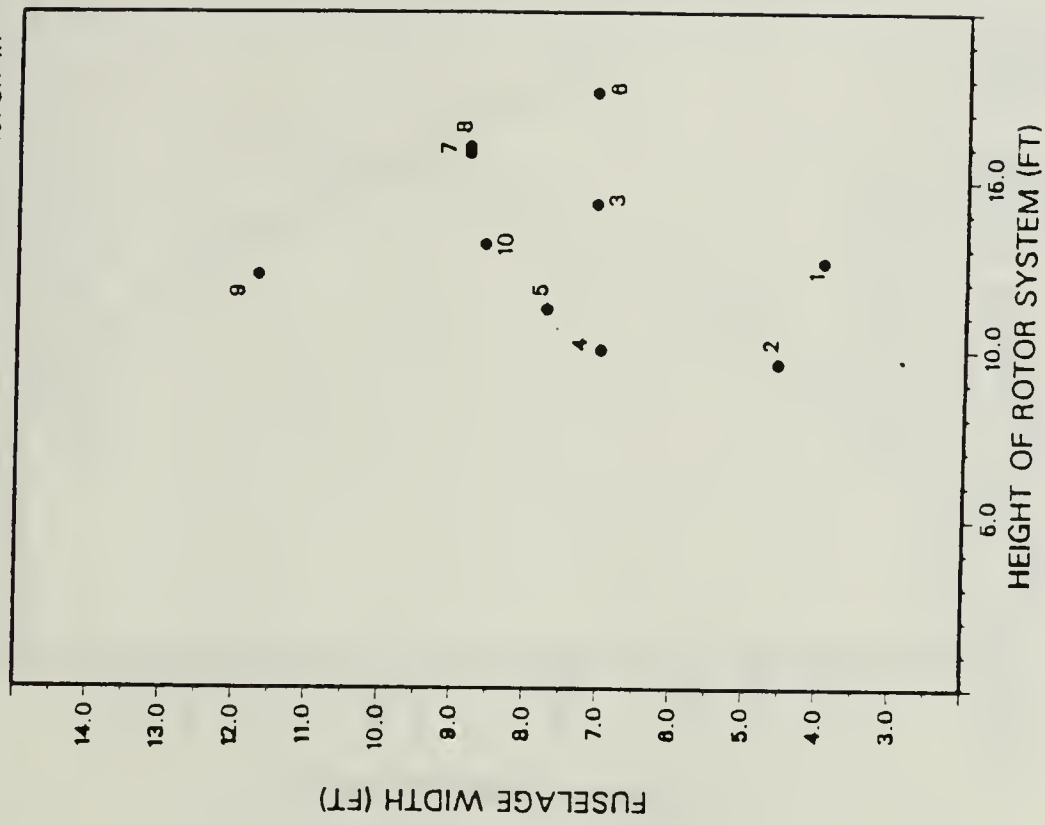


Fig. 5-17.

Fig. 5-16 and 5-17.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

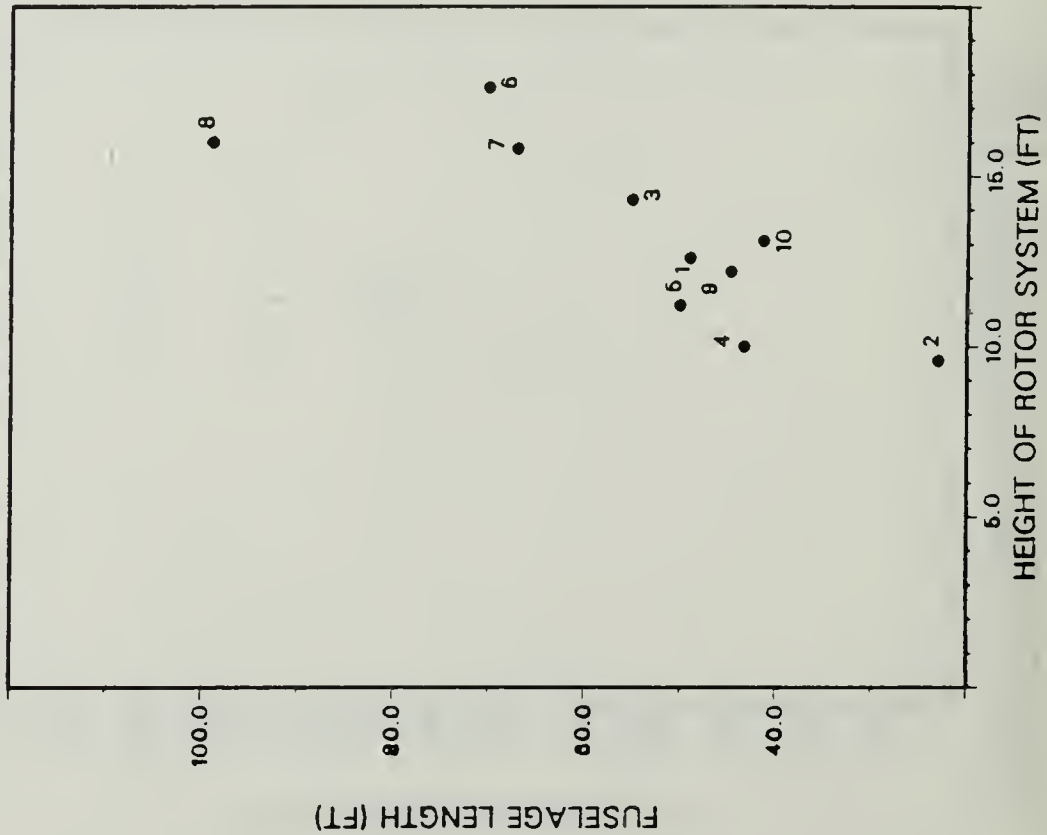


Fig. 5-18a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

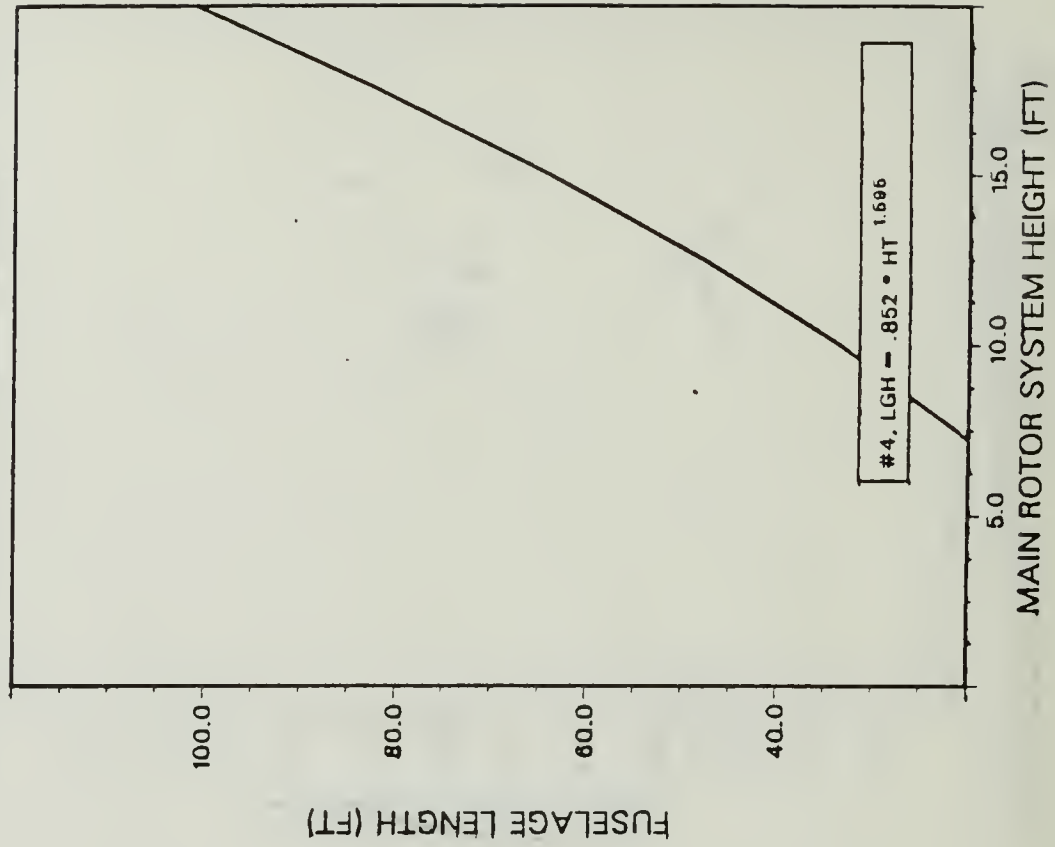


Fig. 5-18b.

Fig. 5-18a and 5-18b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

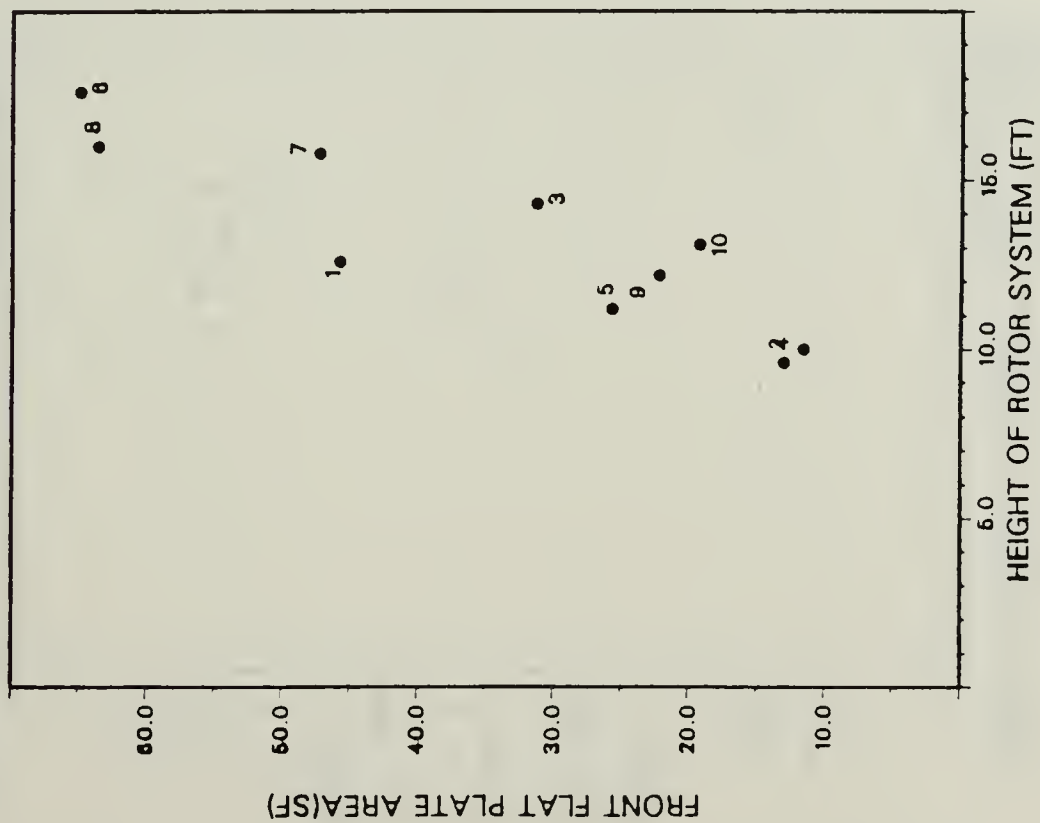


Fig. 5-19a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

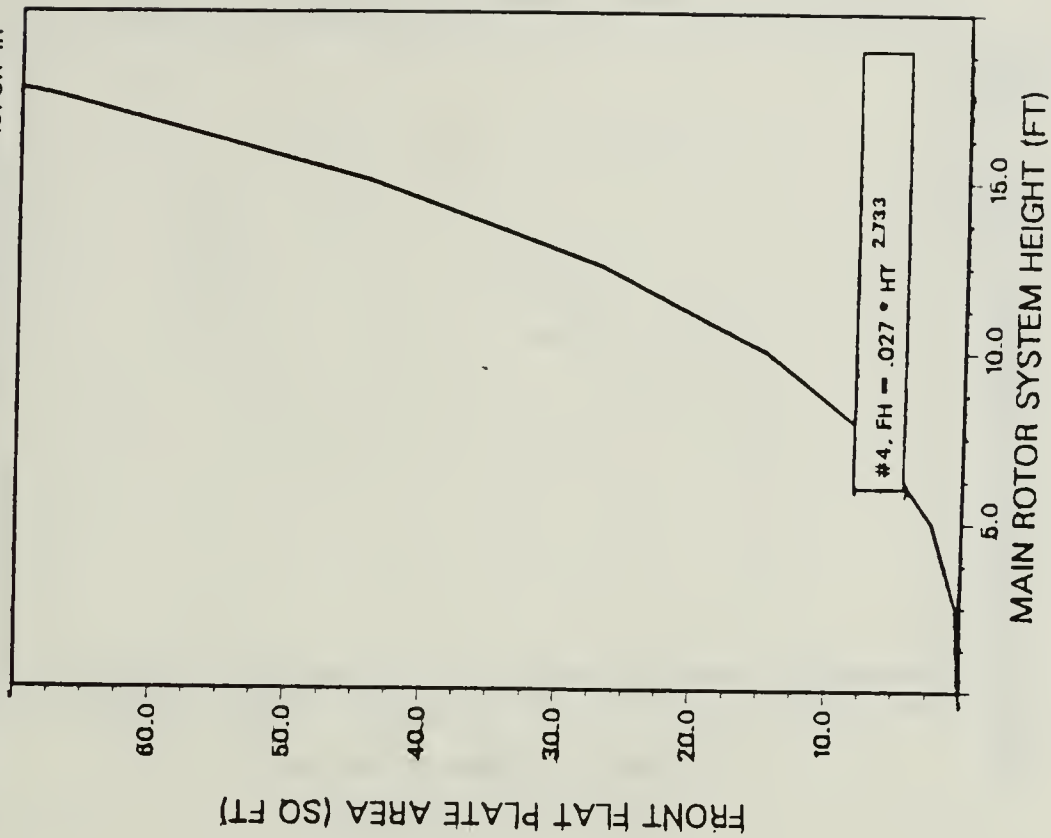


Fig. 5-19b.

Fig. 5-19a and 5-19b.

HELICOPTER DESIGN

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

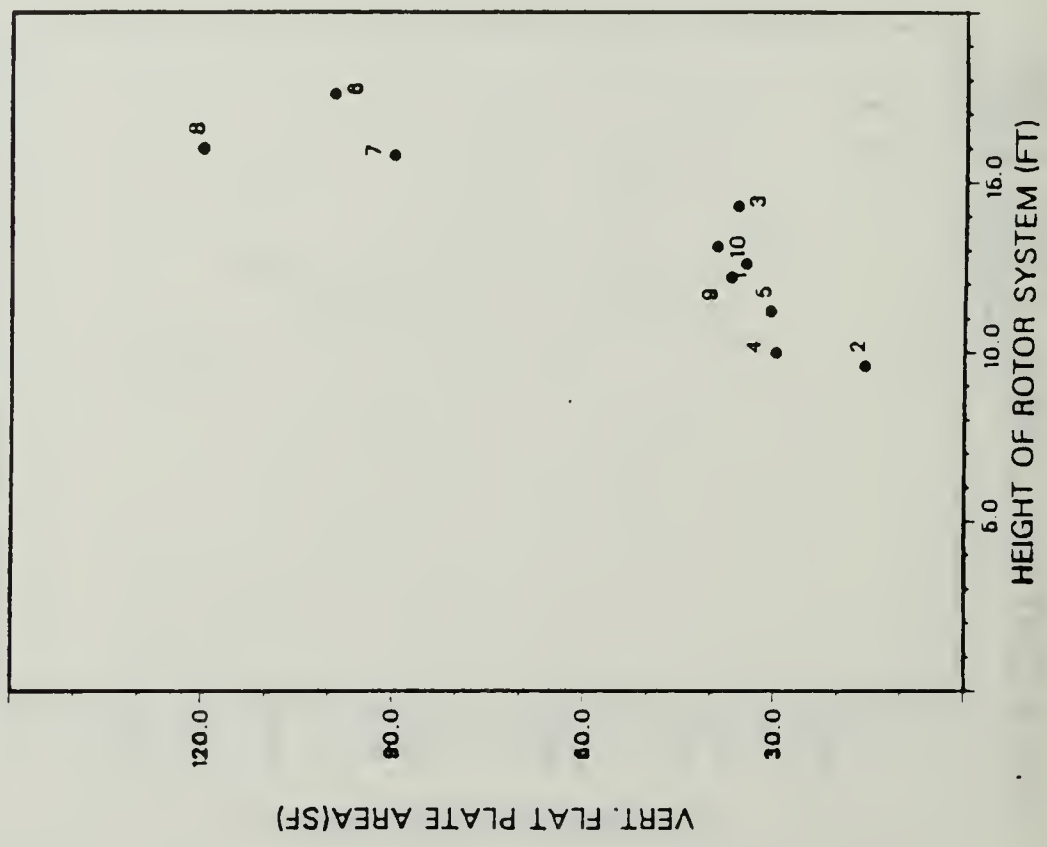


Fig. 5-20.

HELICOPTER DESIGN

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

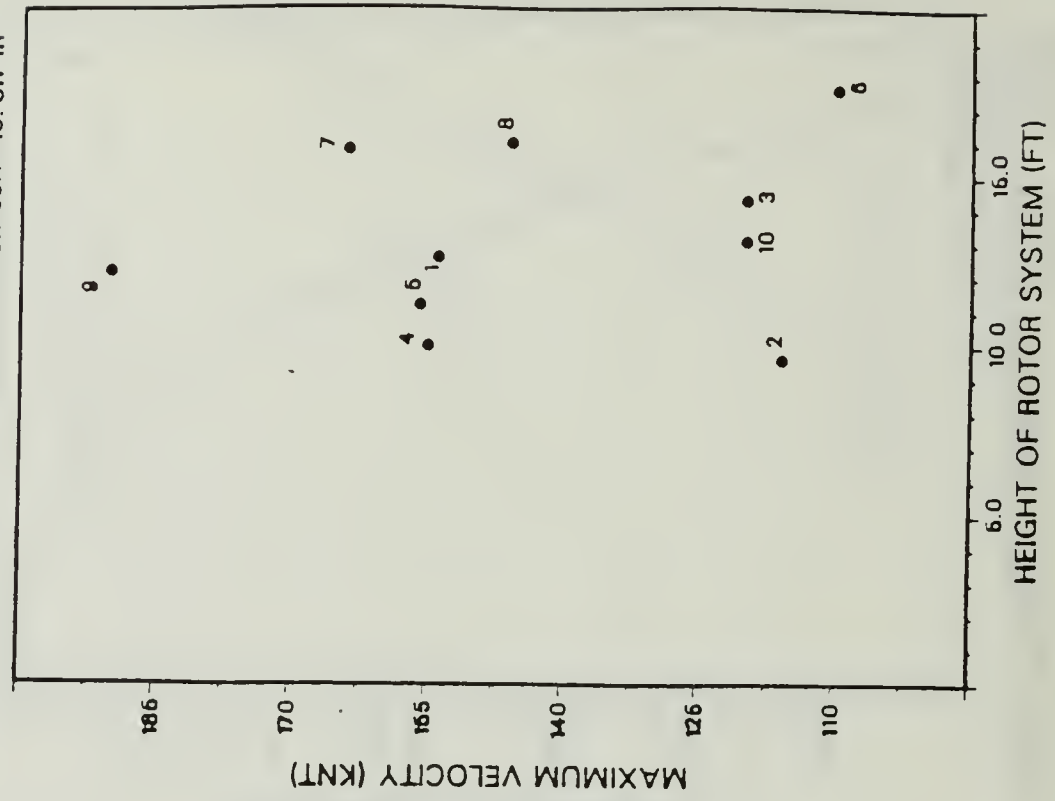


Fig. 5-21.

Fig. 5-20 and 5-21.

HELICOPTER DESIGN

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

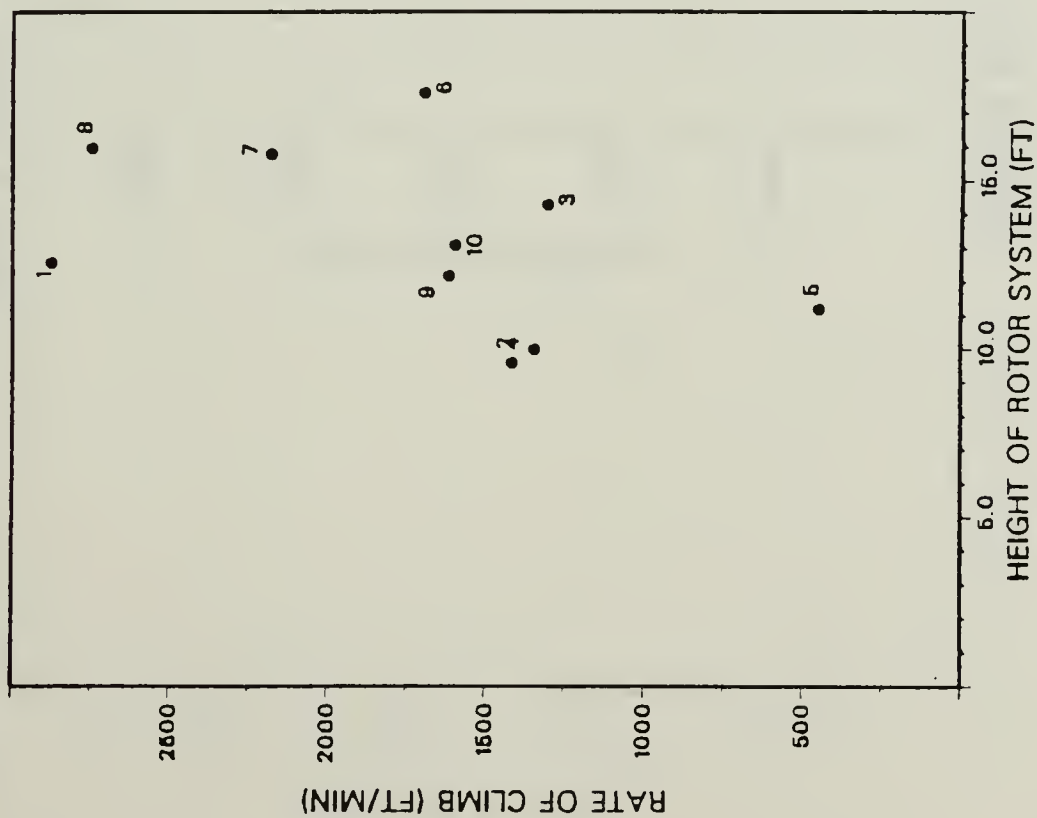


Fig. 5-23.

HELICOPTER DESIGN

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

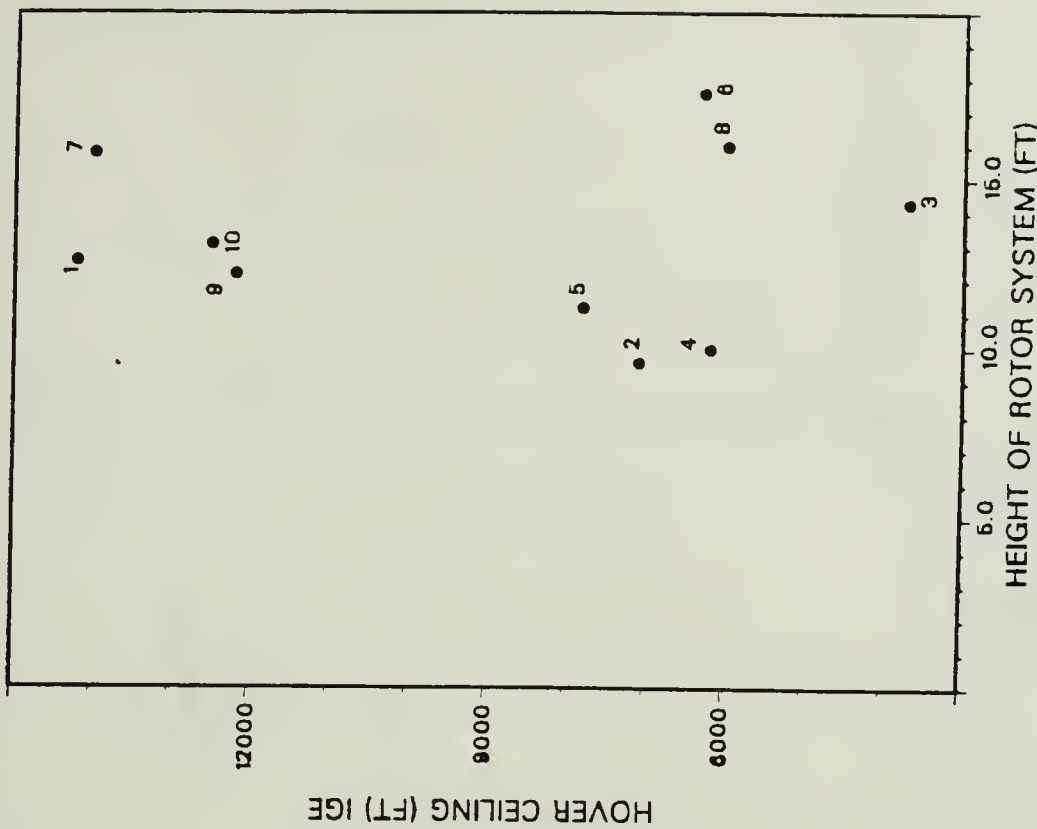


Fig. 5-24.

Fig. 5-23 and 5-24.

HELICOPTER DESIGN

- | | |
|-----------|-----------|
| 1. AH-64 | 6. CH-54B |
| 2. OH-58C | 7. CH-63D |
| 3. SH-3H | 8. CH-63E |
| 4. S-76 | 9. AH-1S |
| 5. UH-60A | 10. UH-1H |

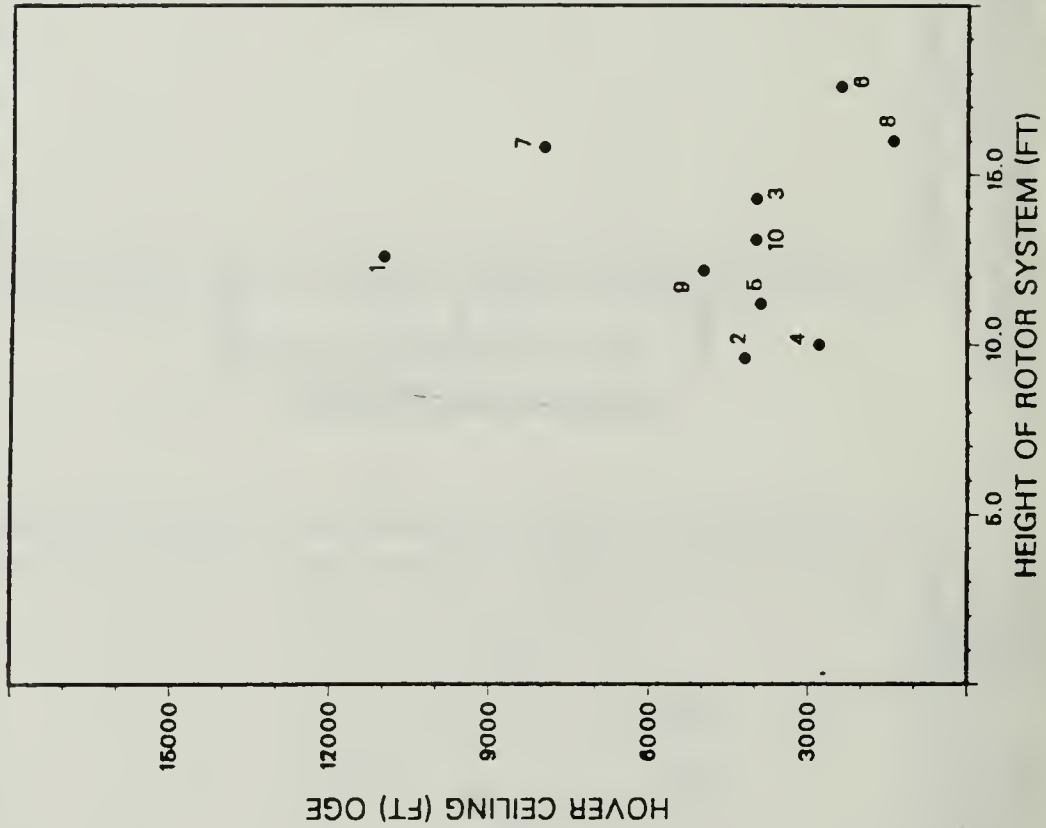


Fig. 5-25.

Fig. 5-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
6. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

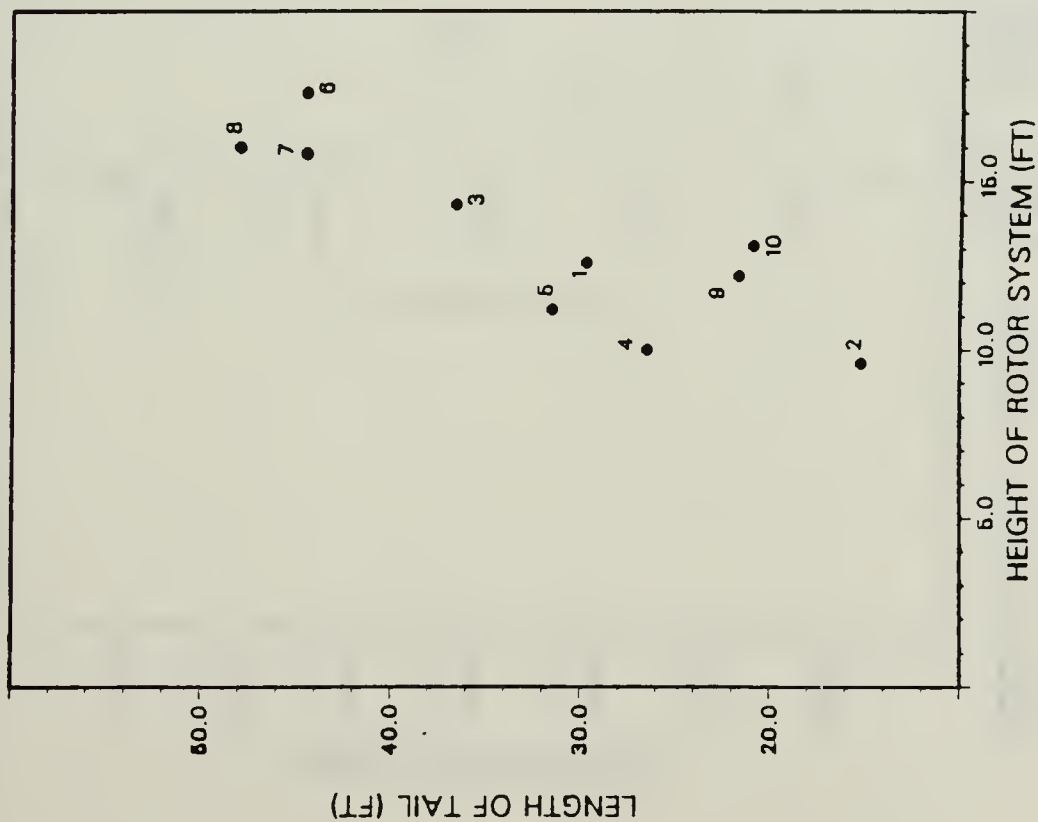


Fig. 5-26a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

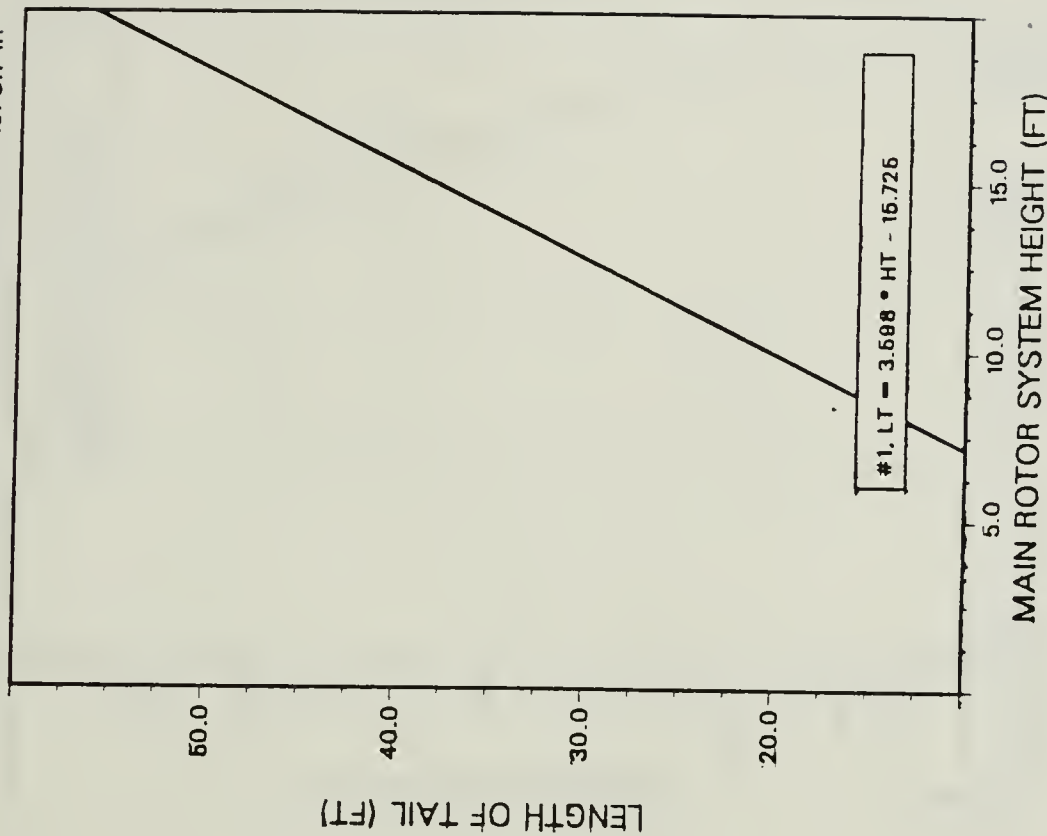


Fig. 5-26b.

Fig. 5-26a and 5-26b.

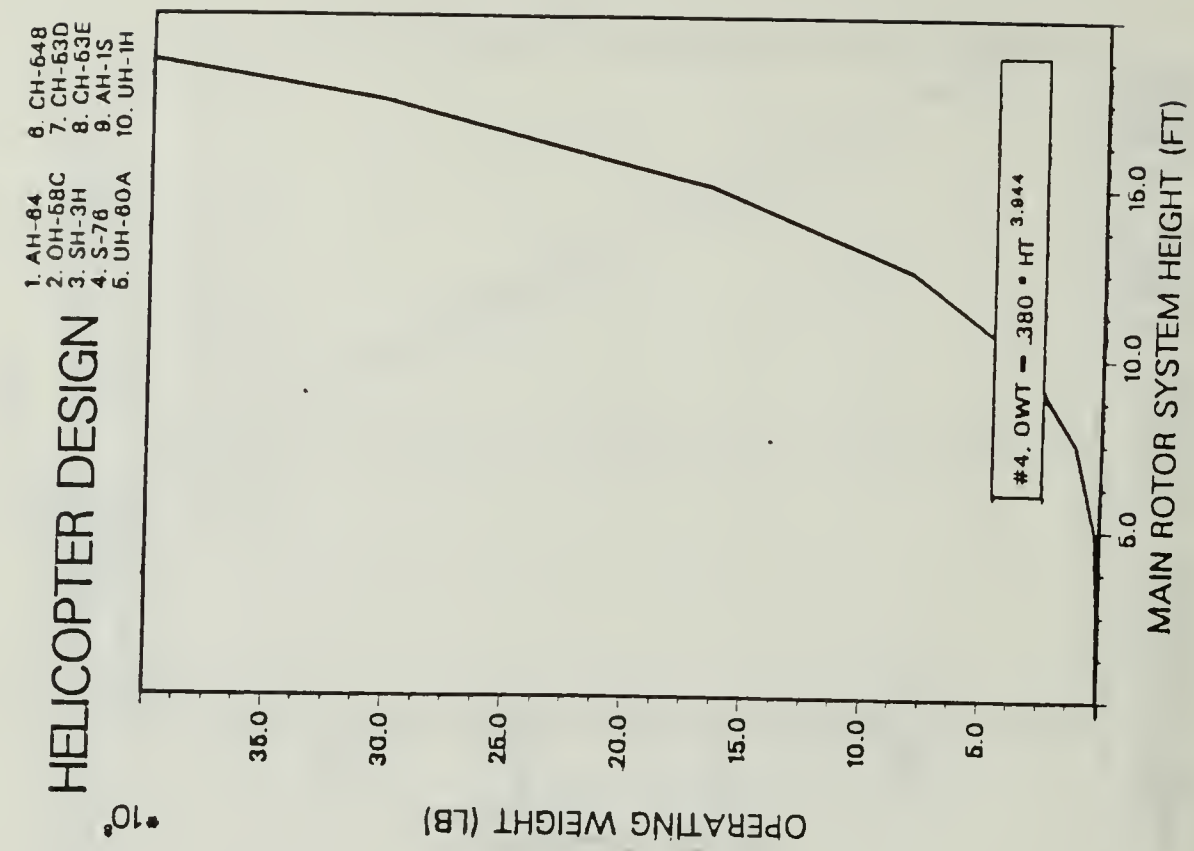


Fig. 5-27b.

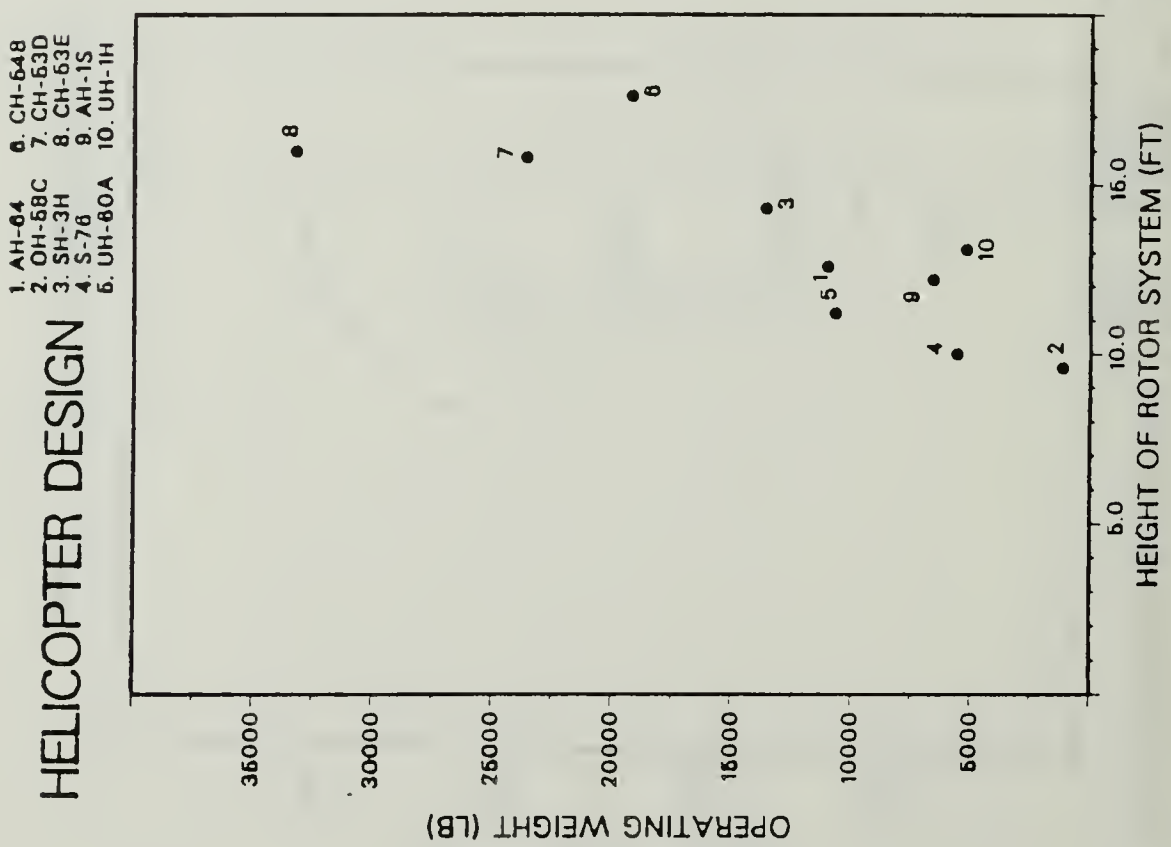


Fig. 5-27a.

Fig. 5-27a and 5-27b.

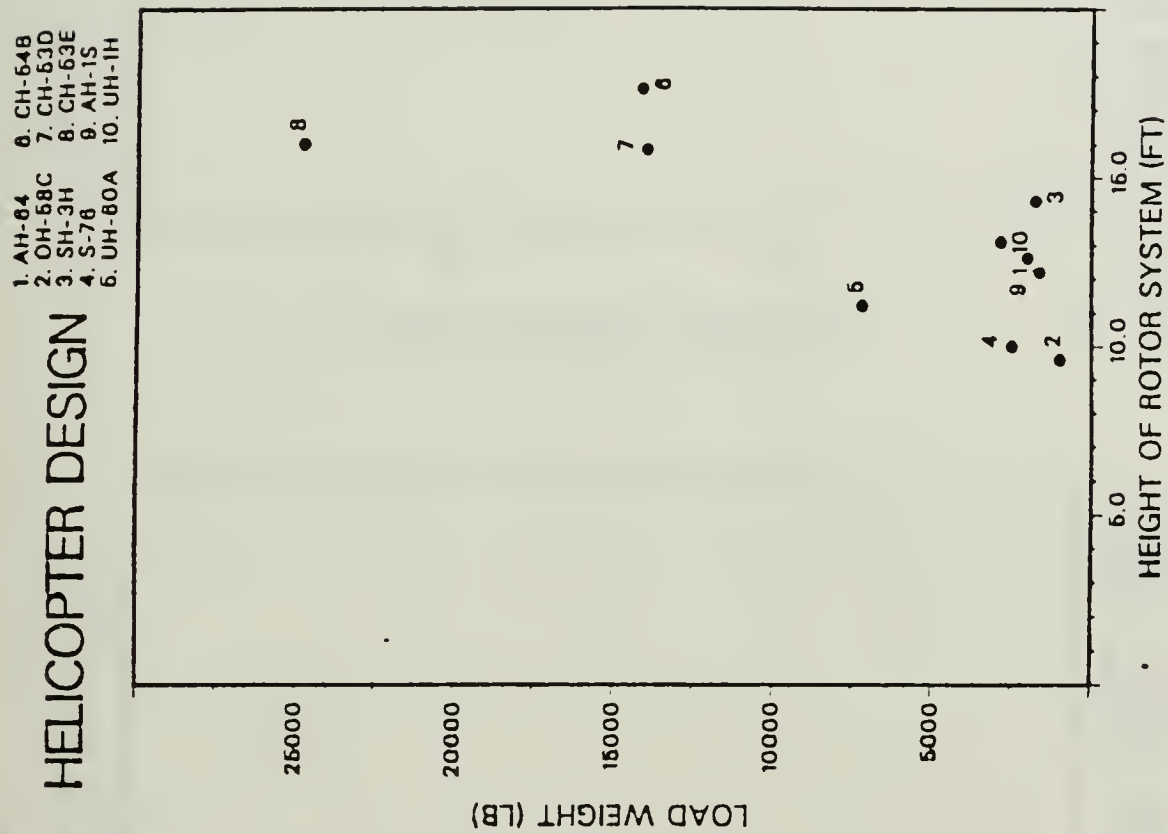


Fig. 5-28.

Fig. 5-28.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

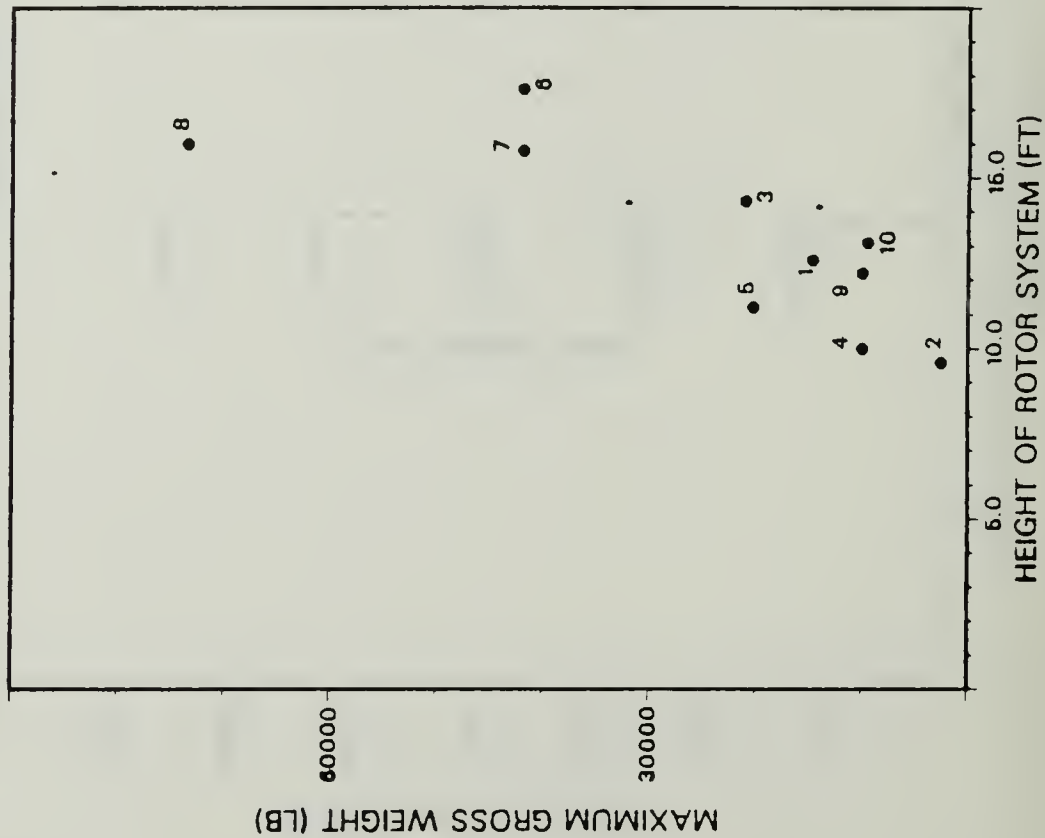


Fig. 5-30a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

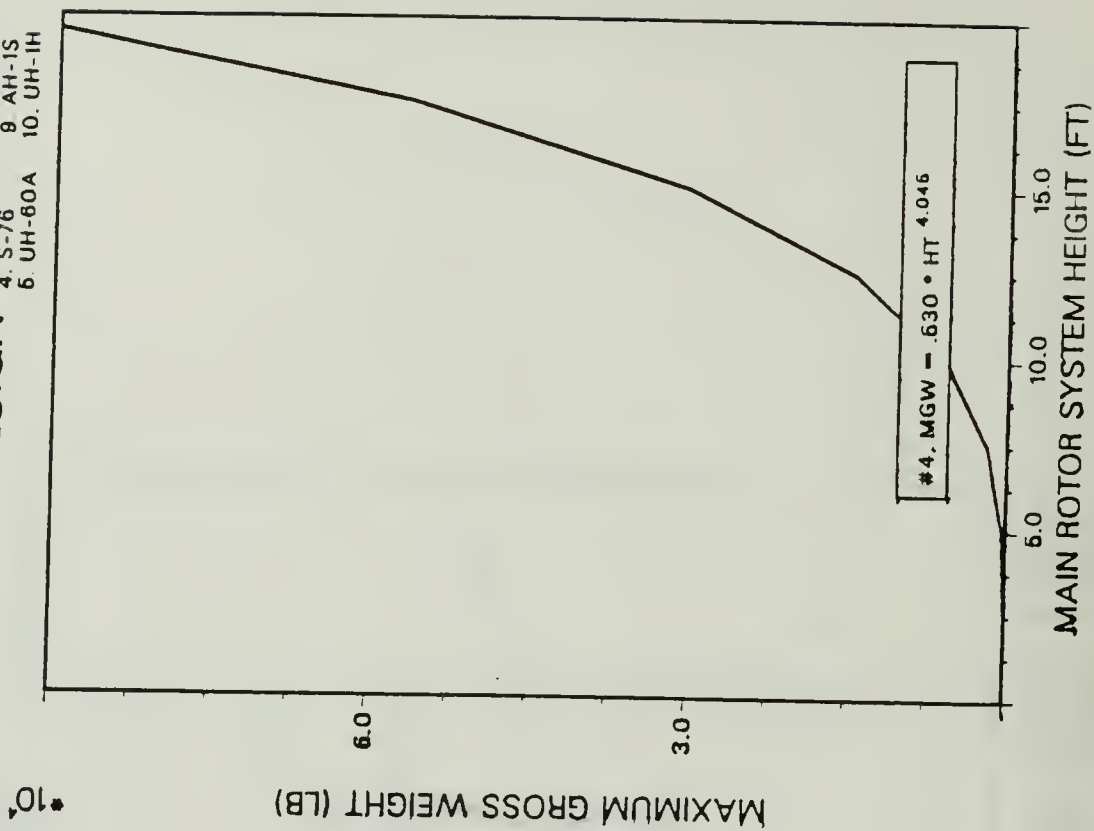


Fig. 5-30b.

Fig. 5-30a and 5-30b.

Speed of Main Rotor Pairings.

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

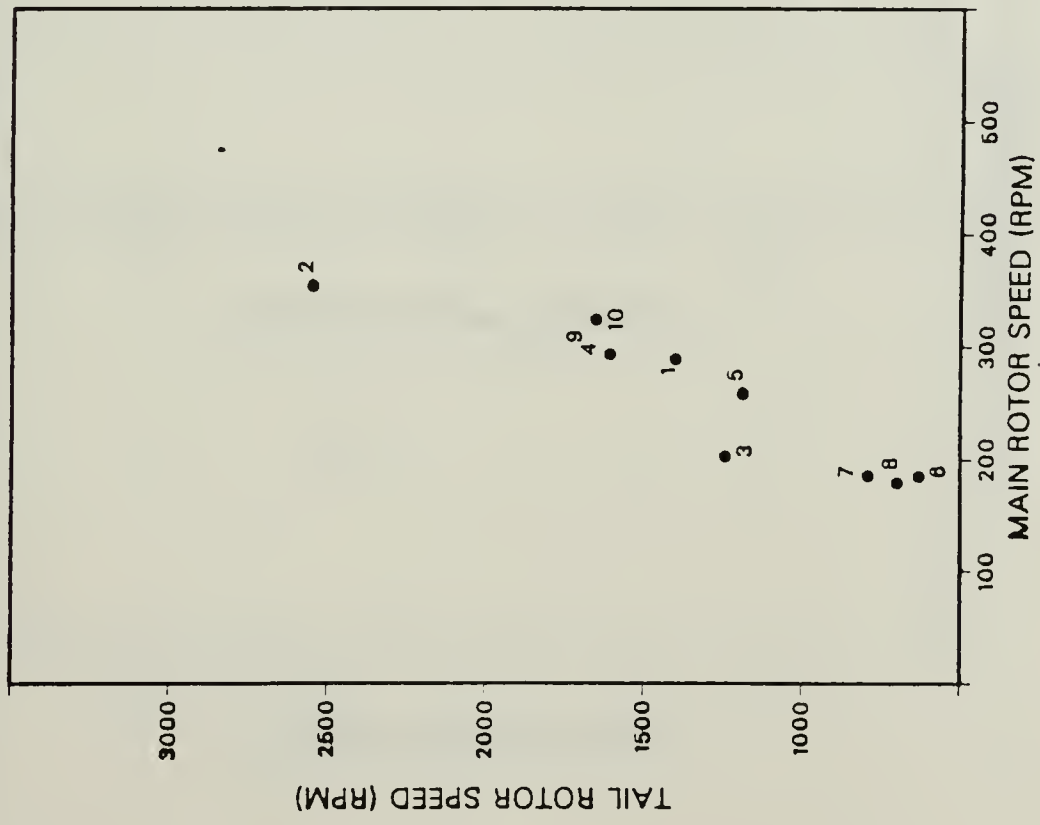


Fig. 6-7a.

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

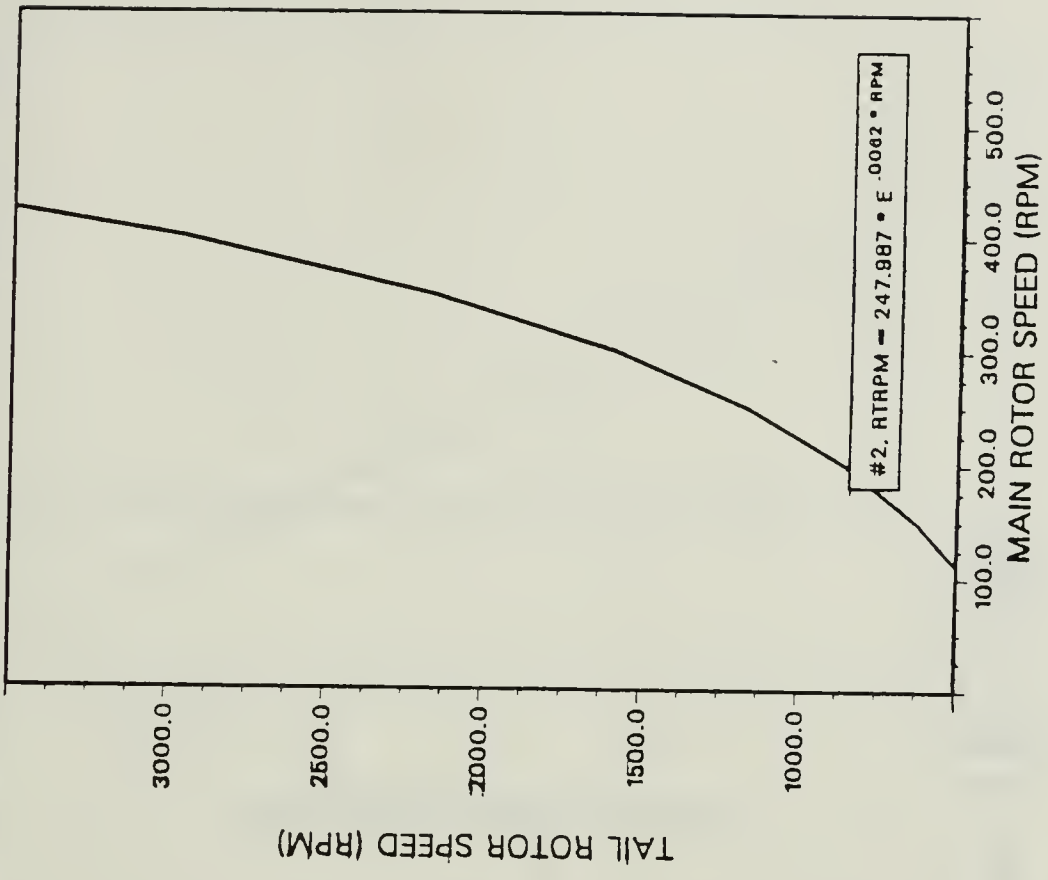


Fig. 6-7b.

Fig. 6-7a and 6-7b.

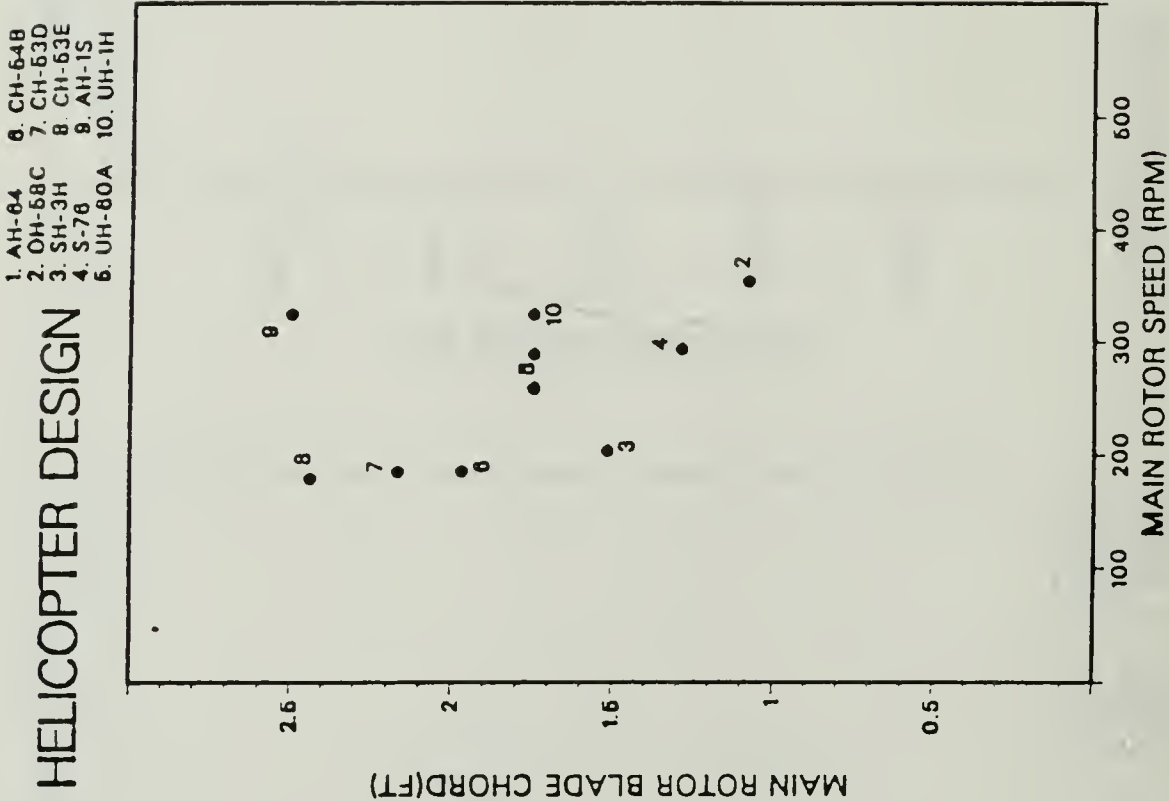


Fig. 6-8.

Fig. 6-8.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
6. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

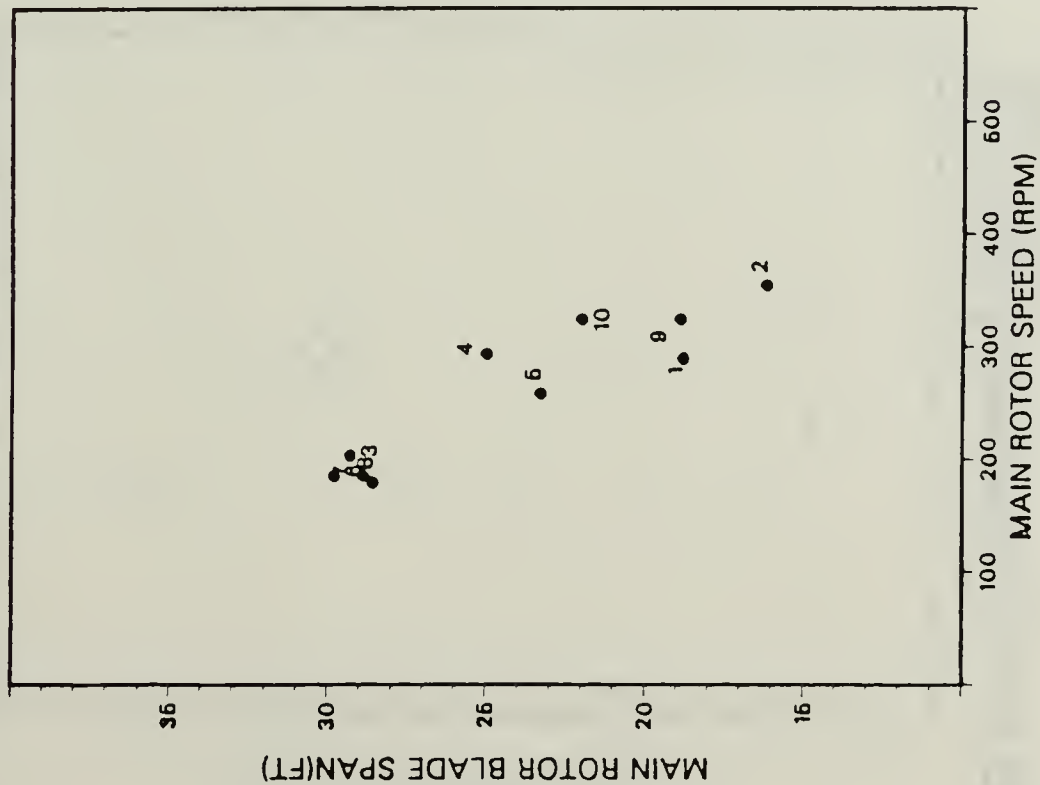


Fig. 6-10a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
6. UH-60A
8. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

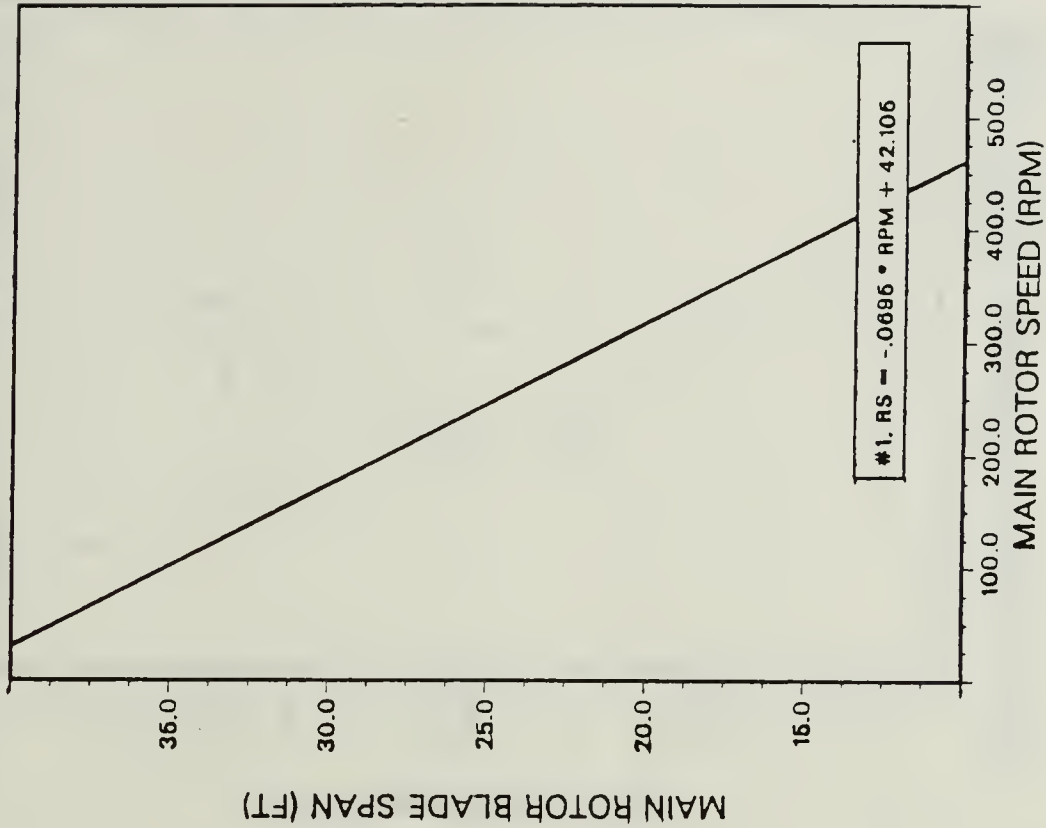


Fig. 6-10b.

Fig. 6-10a and 6-10b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

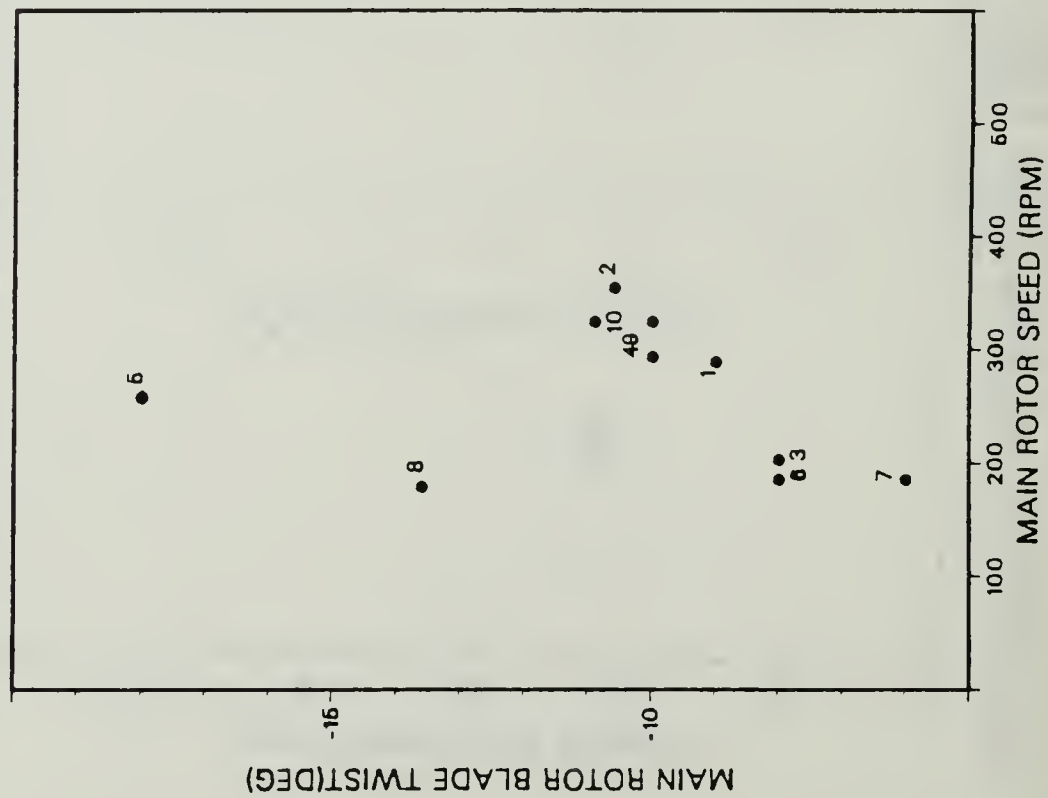


Fig. 6-12.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

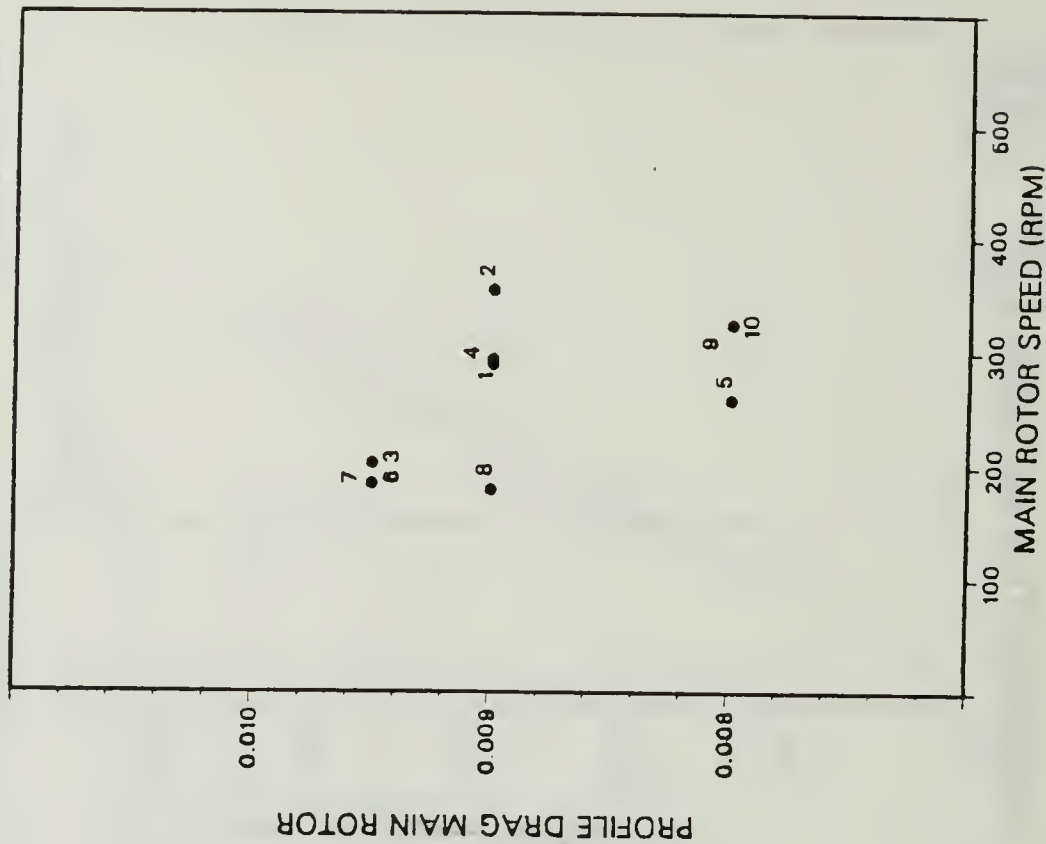


Fig. 6-14.

Fig. 6-12 and 6-14.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

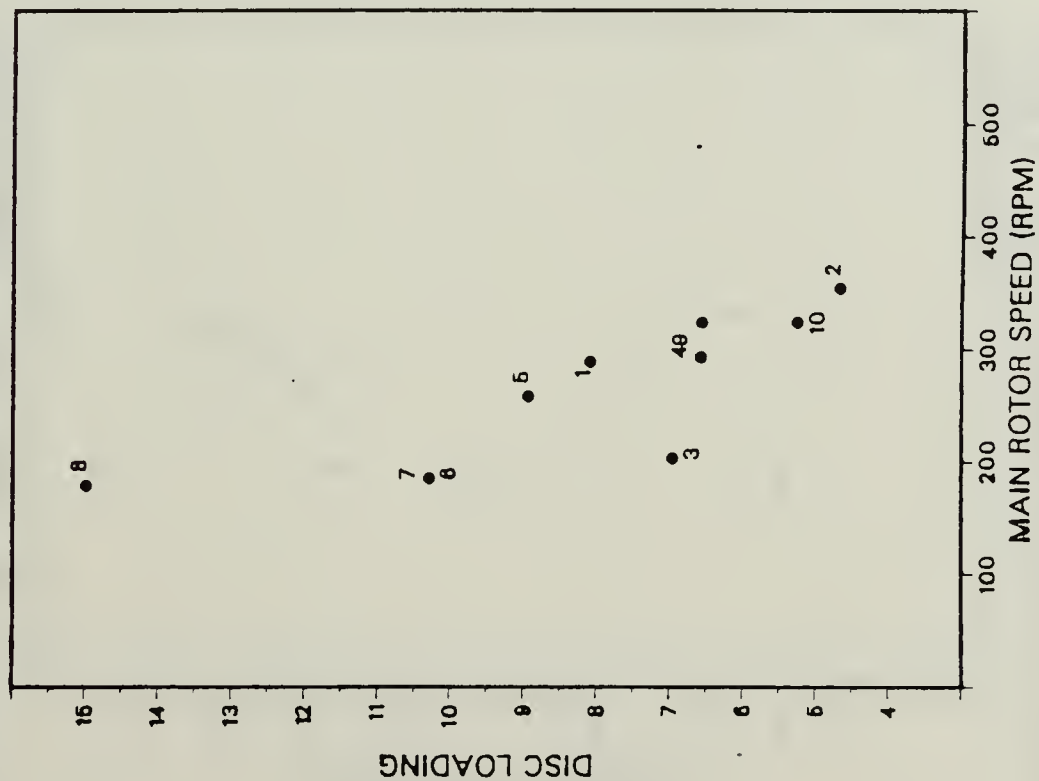


Fig. 6-16a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

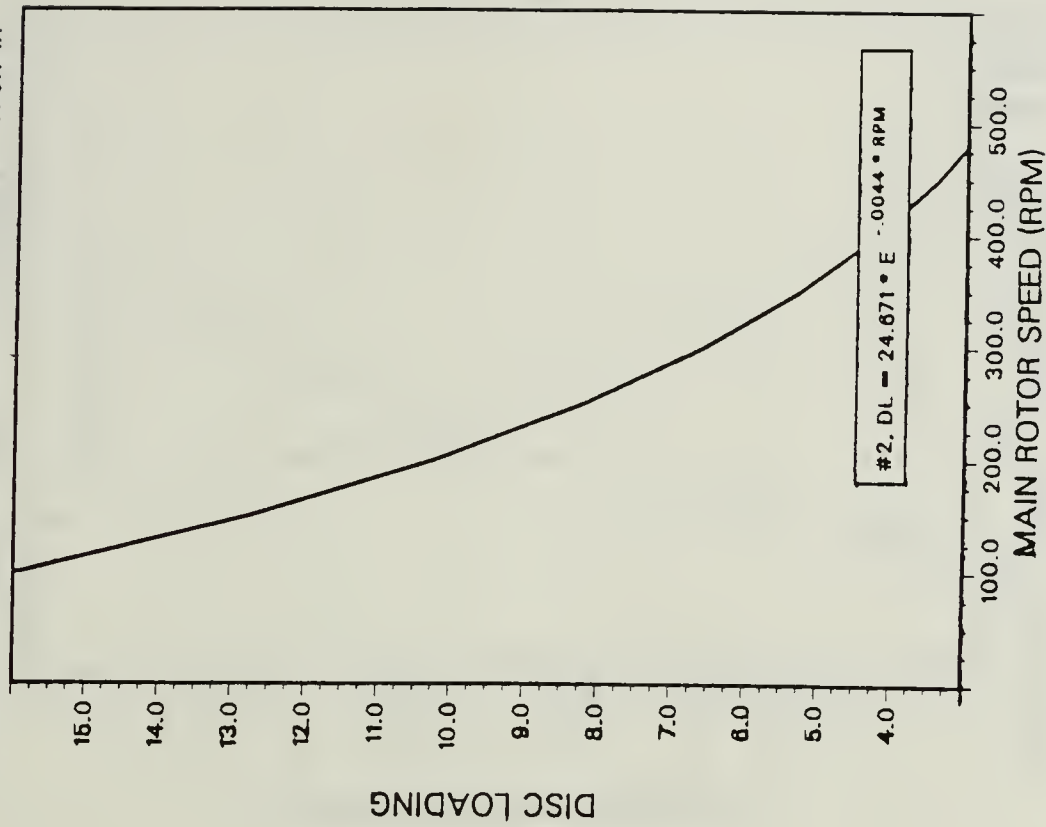


Fig. 6-16b.

Fig. 6-16a and 6-16b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

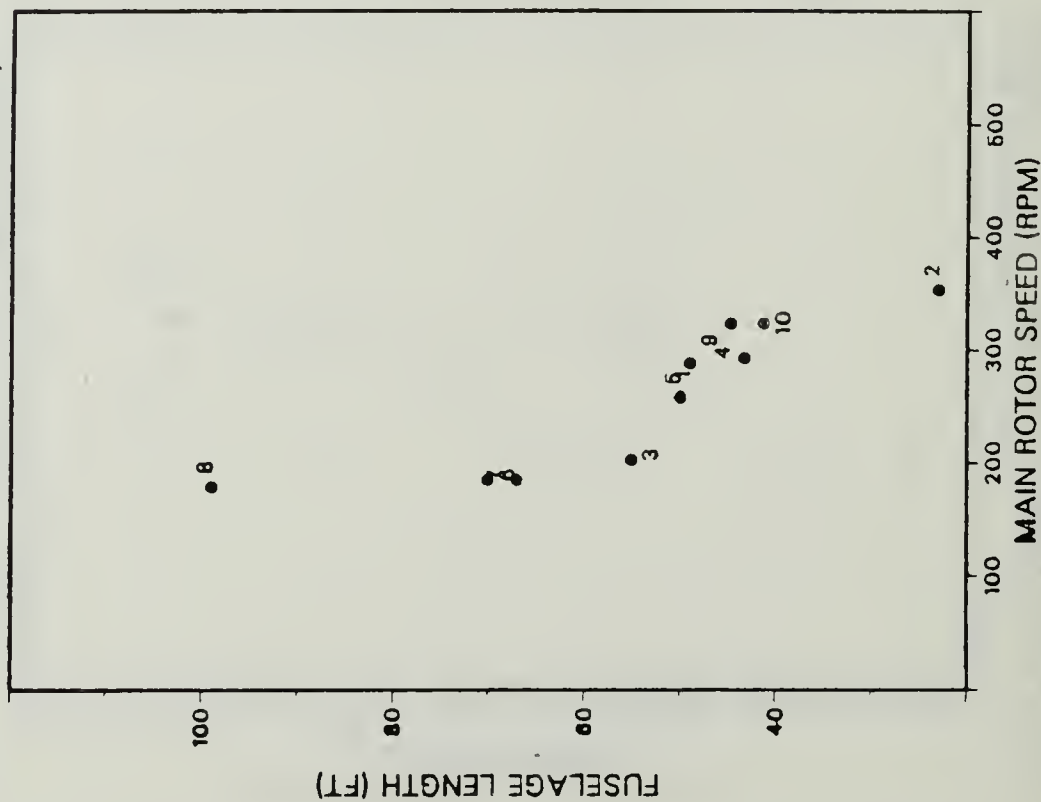


Fig. 6-18a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

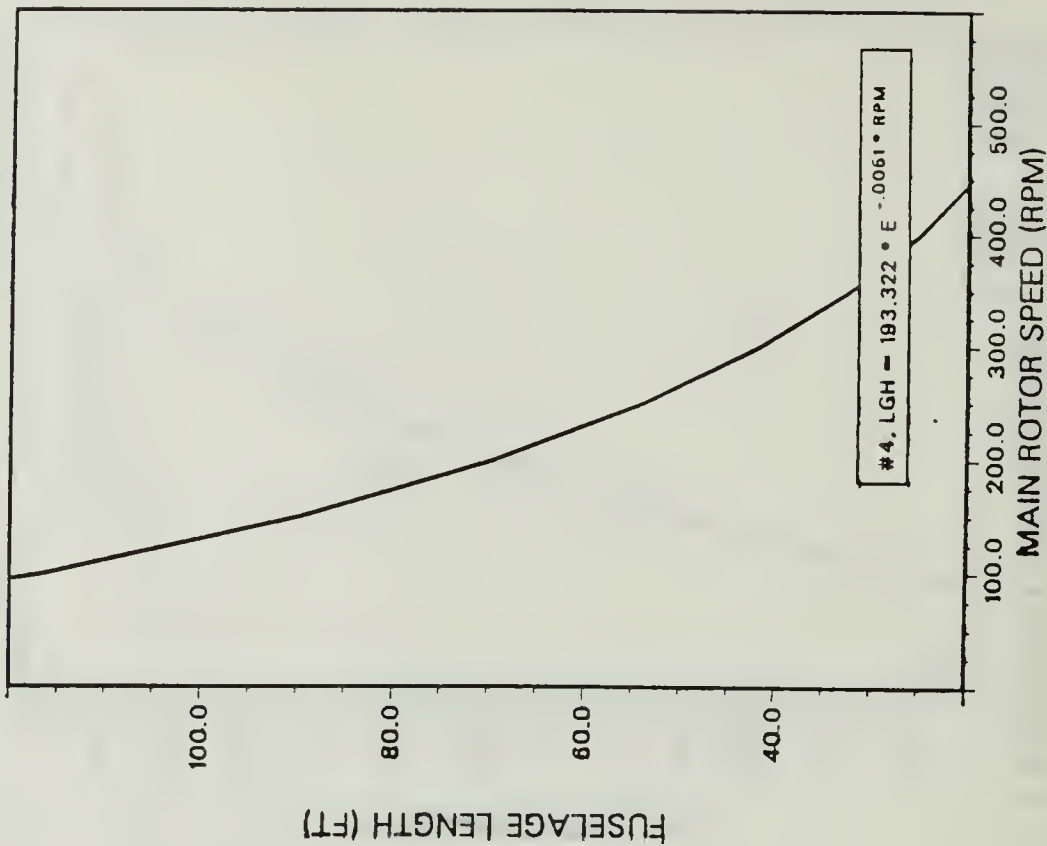


Fig. 6-18b.

Fig. 6-18a and 6-18b.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

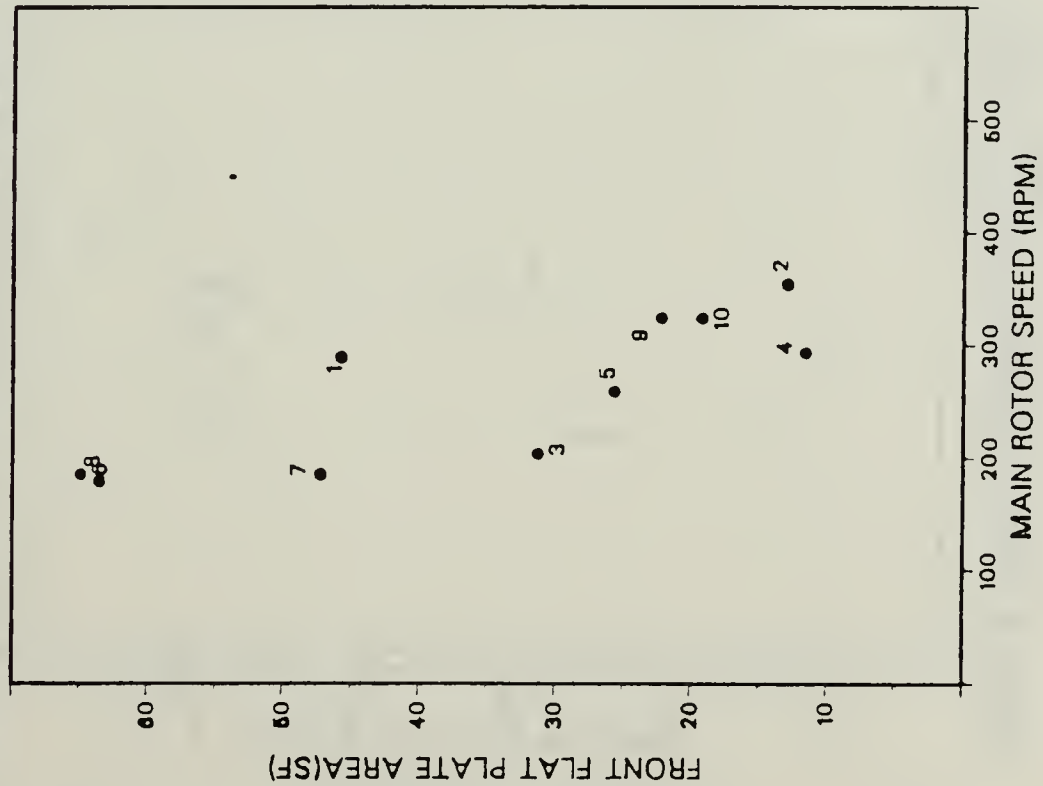


Fig. 6-19a.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

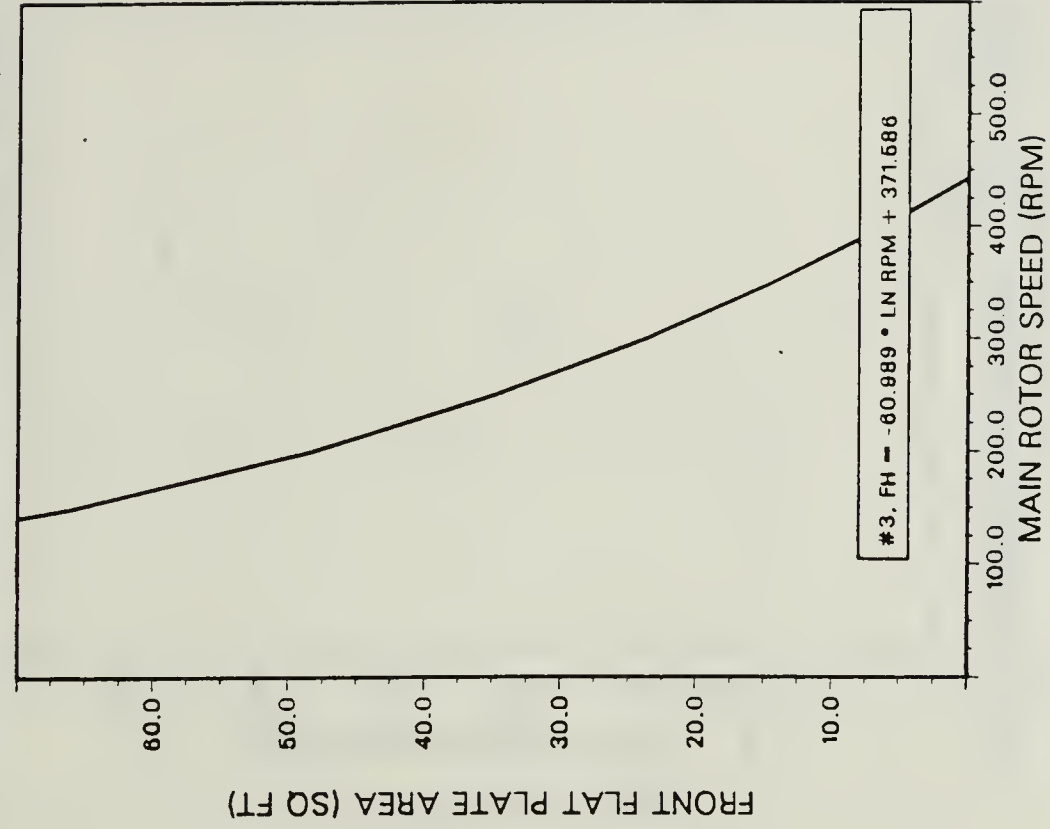


Fig. 6-19b.

Fig. 6-19a and 6-19b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

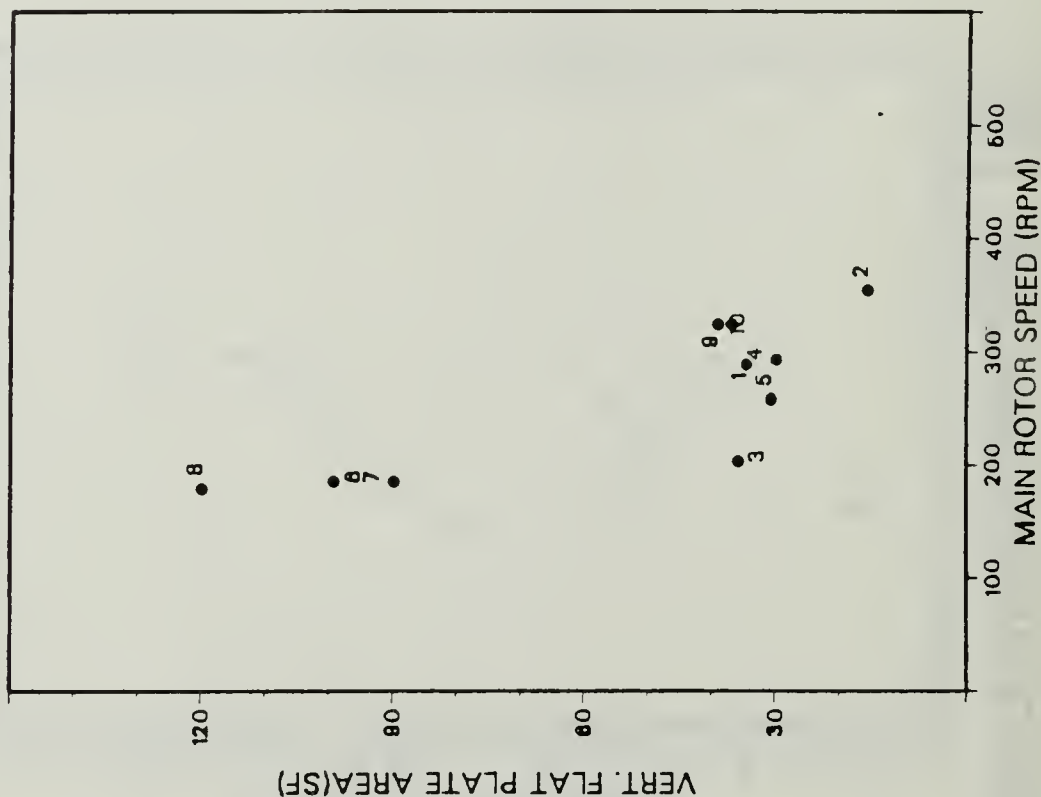


Fig. 6-20.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

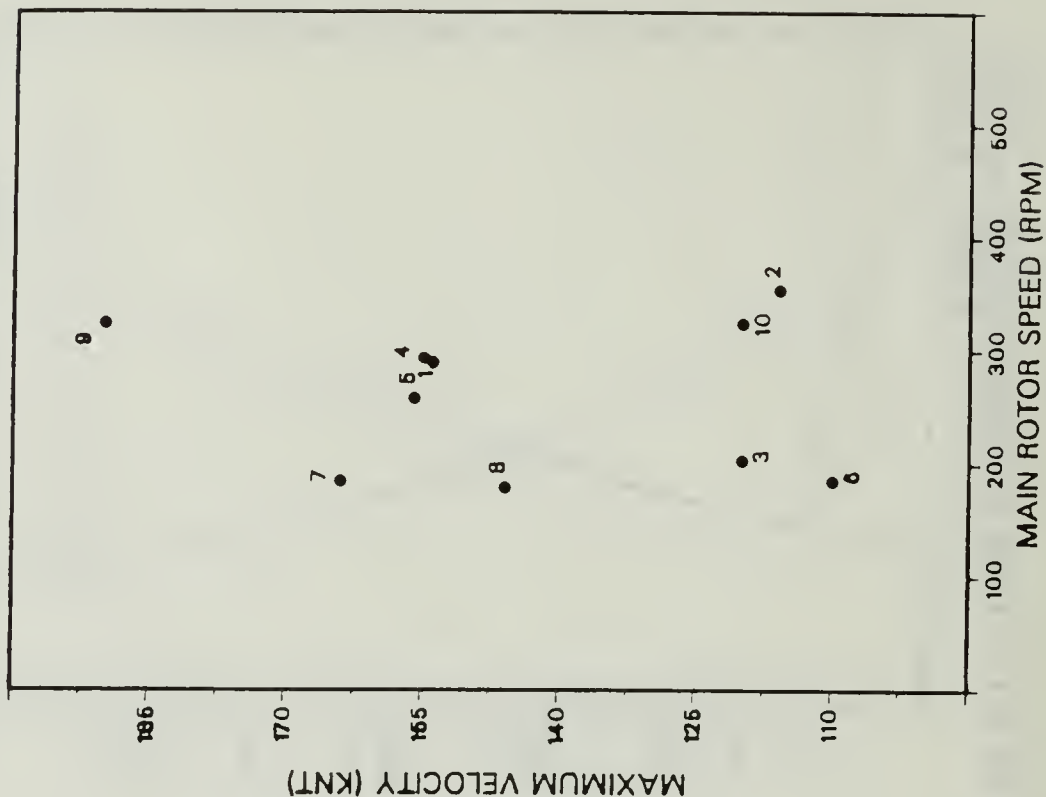


Fig. 6-21.

Fig. 6-20 and 6-21.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
6. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

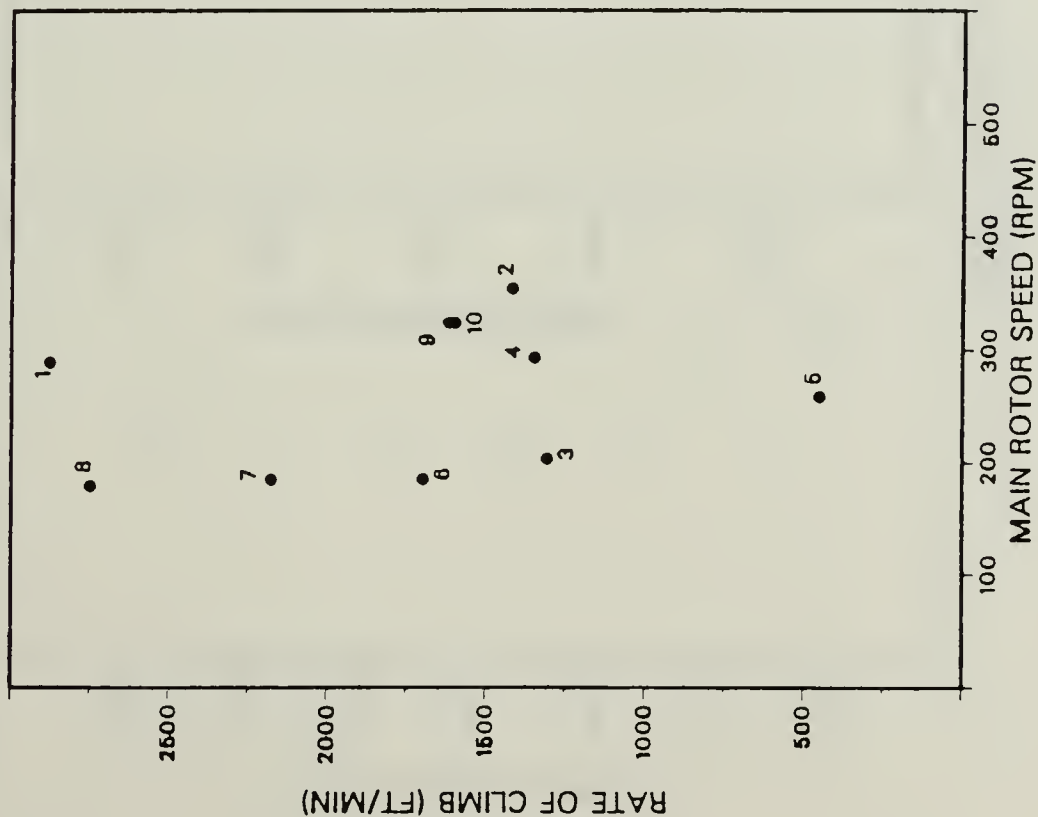


Fig. 6-23.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
6. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

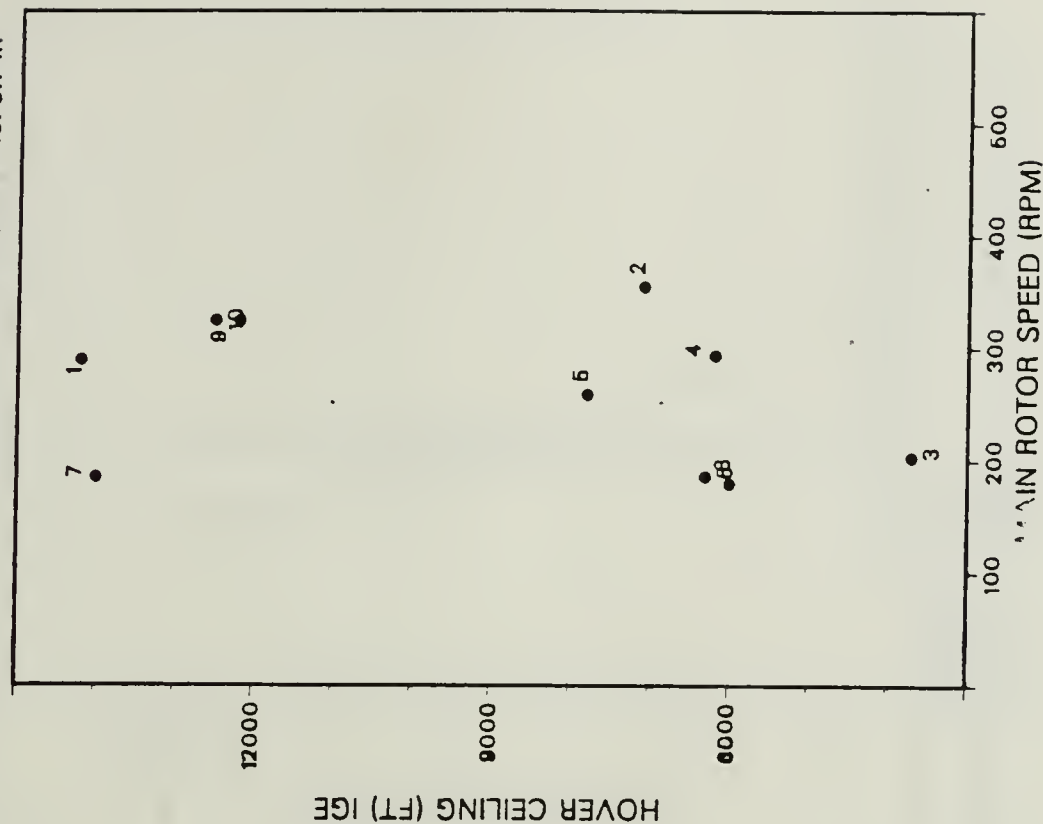


Fig. 6-24.

Fig. 6-23 and 6-24.

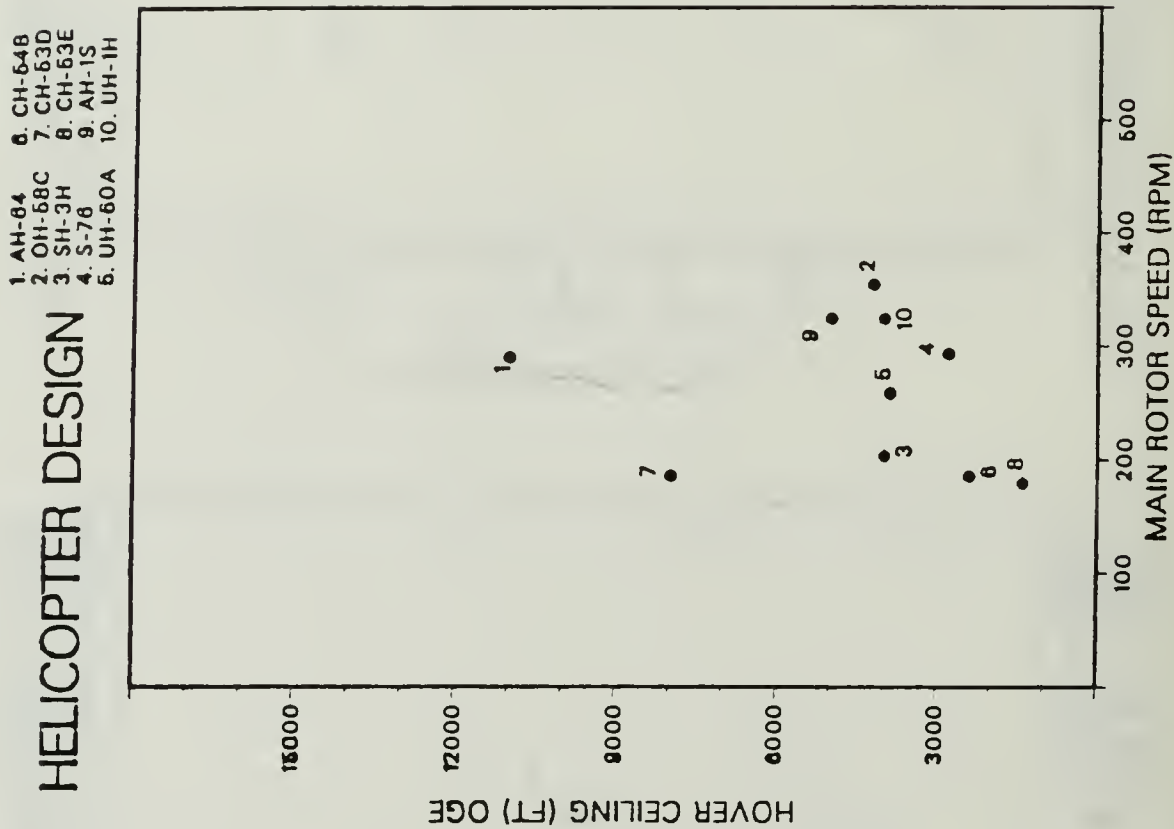


Fig. 6-25.

Fig. 6-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

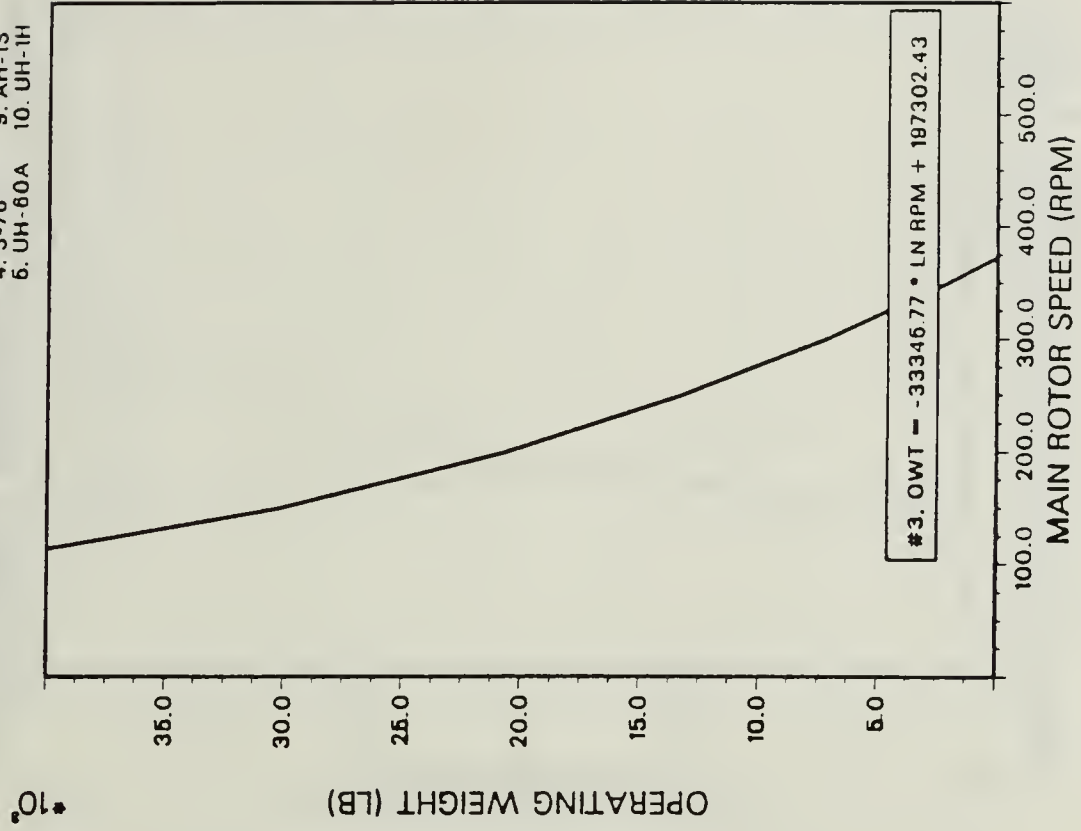


Fig. 6-27b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

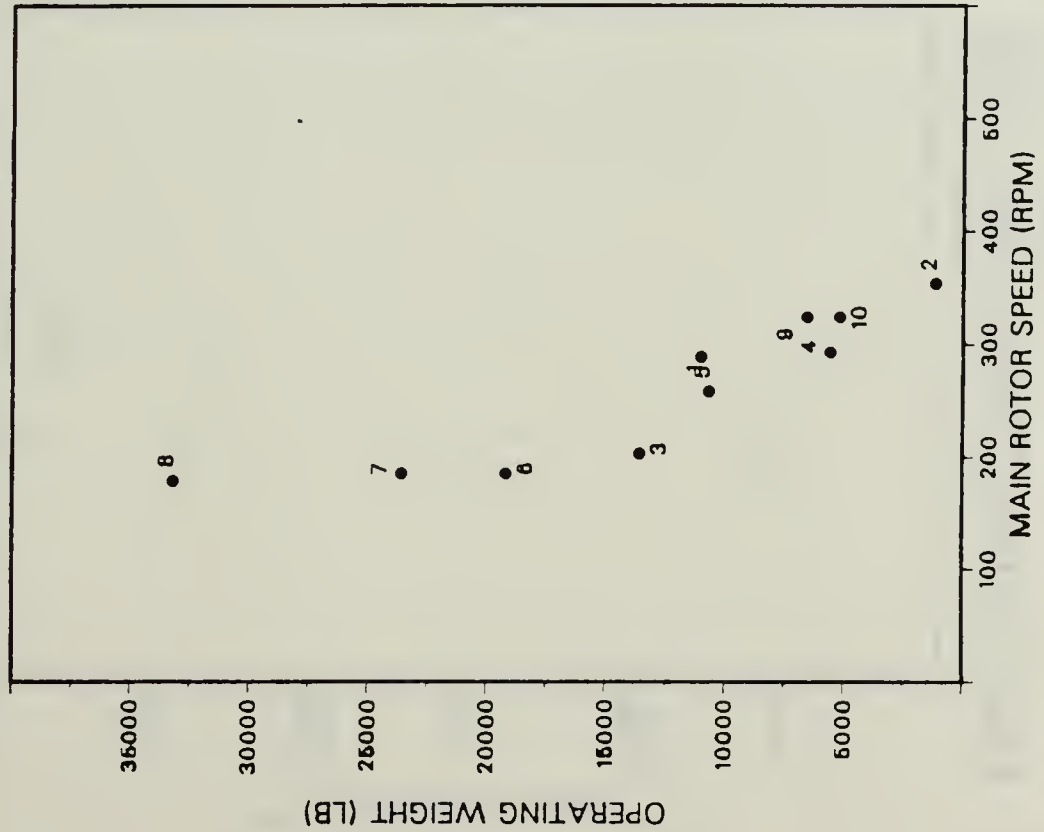


Fig. 6-27a.

Fig. 6-27a and 6-27b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

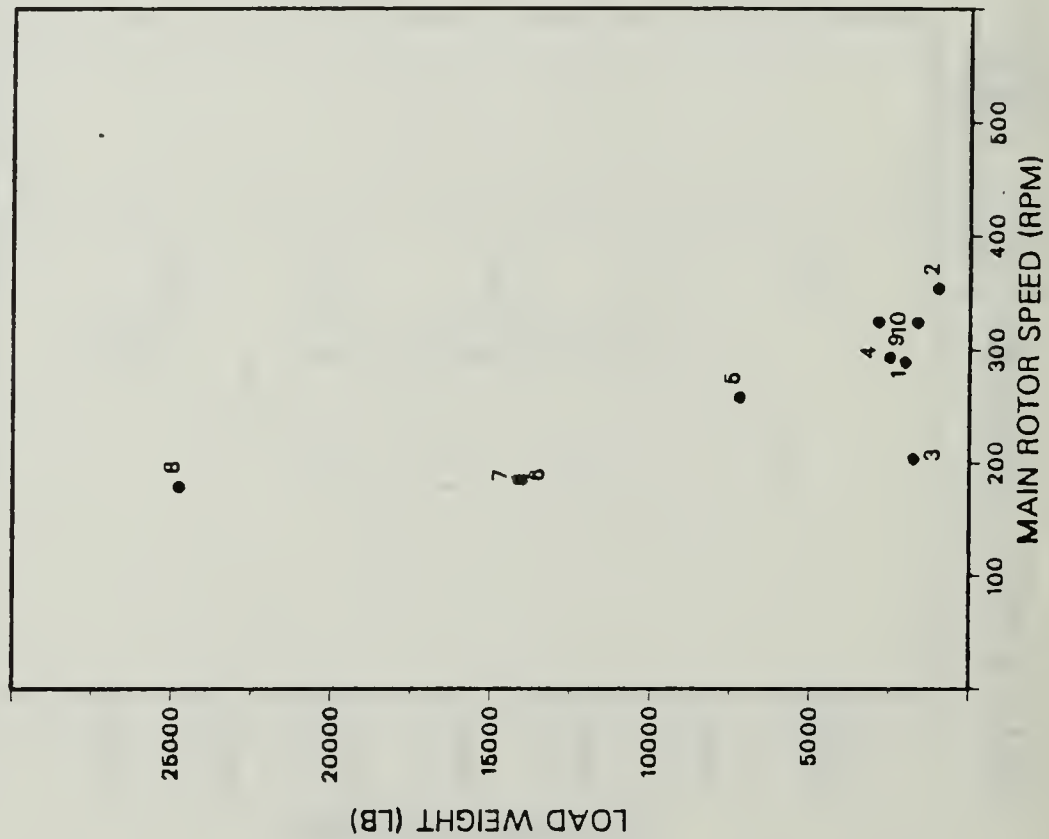


Fig. 6-28a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

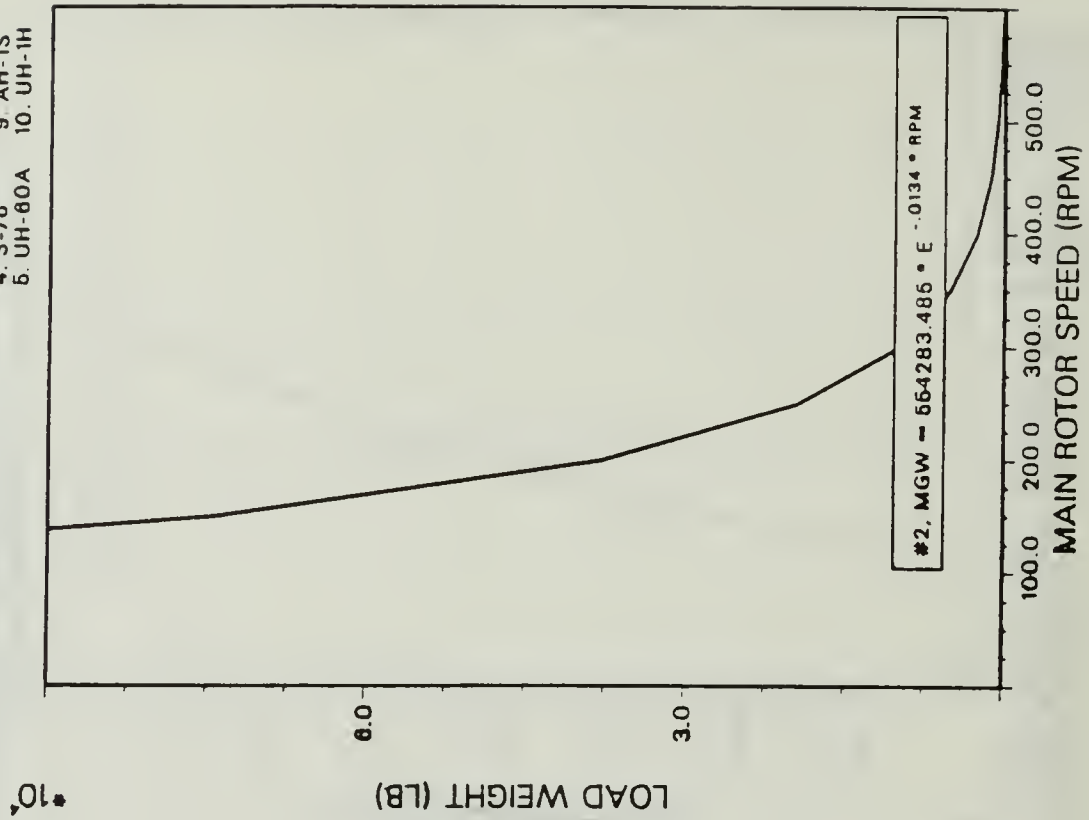


Fig. 6-28b.

Fig. 6-28a and 6-28b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

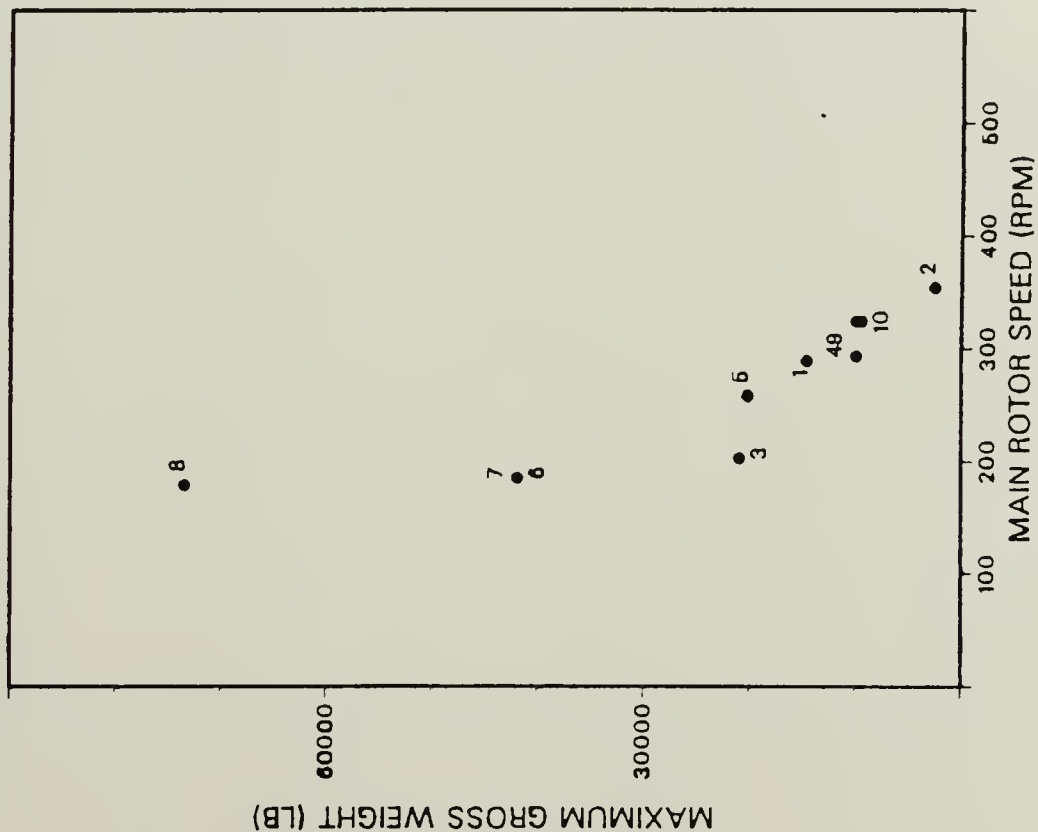


Fig. 6-30a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

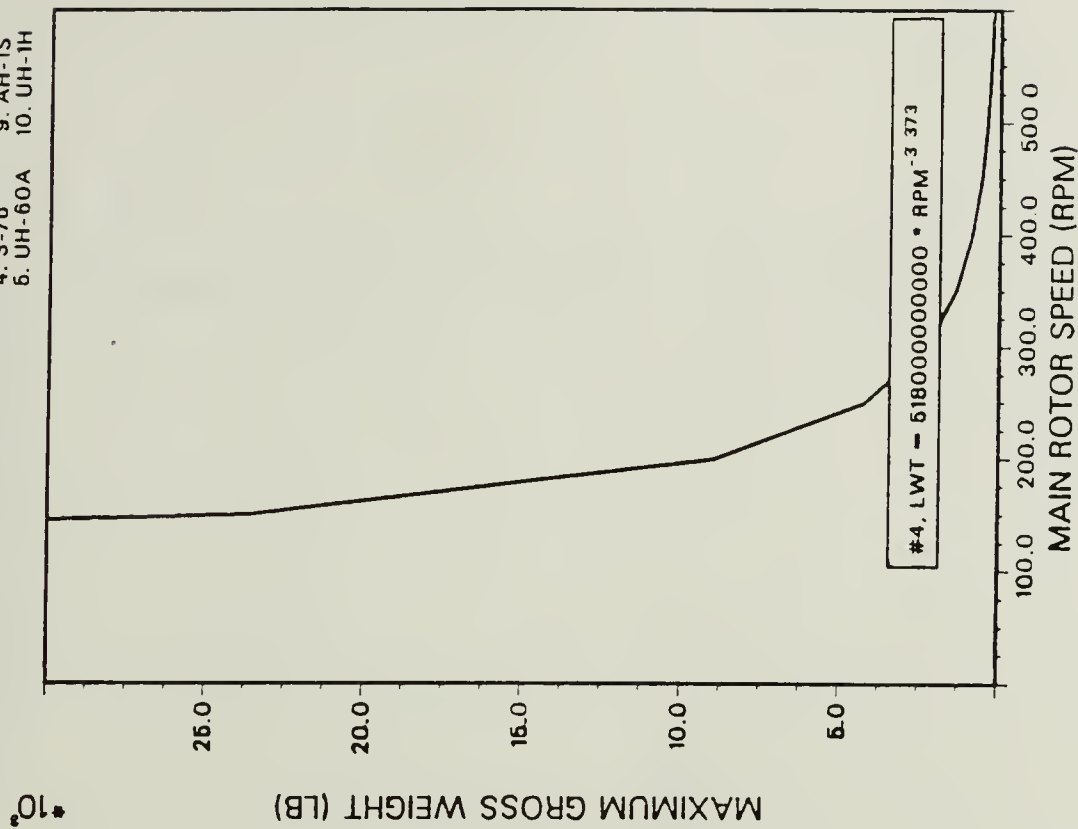


Fig. 6-30b.

Fig. 6-30a and 6-30b.



Speed of Tail Rotor Radius Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

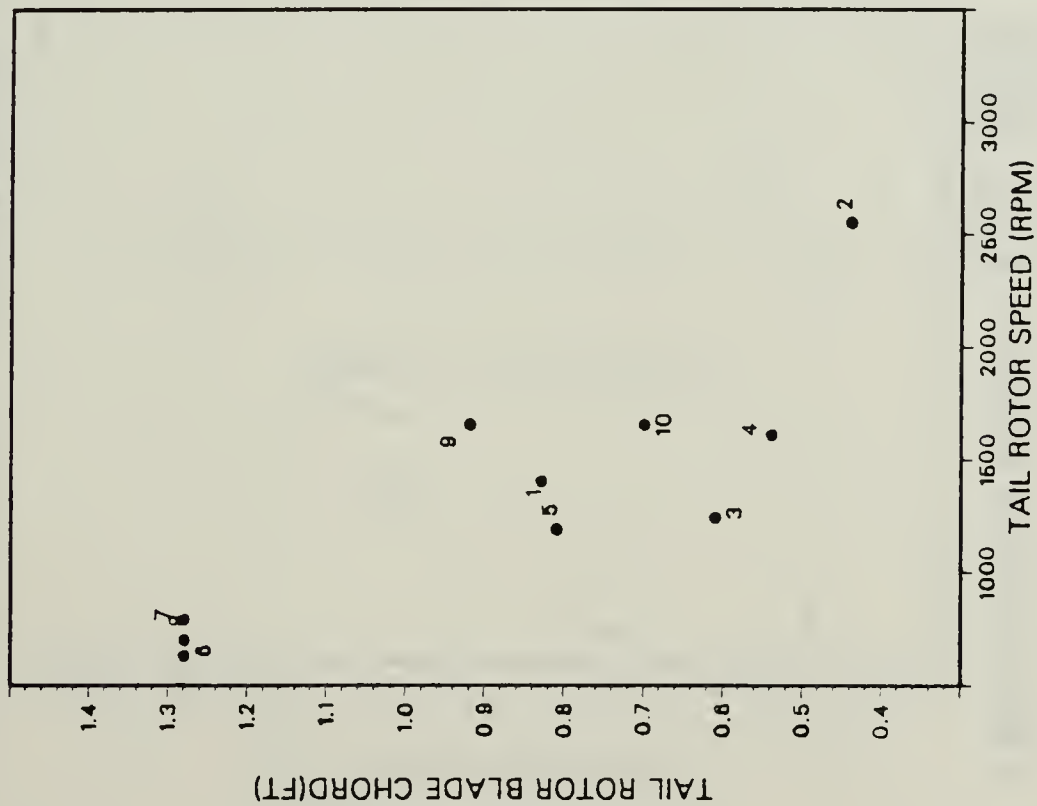


Fig. 7-9a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

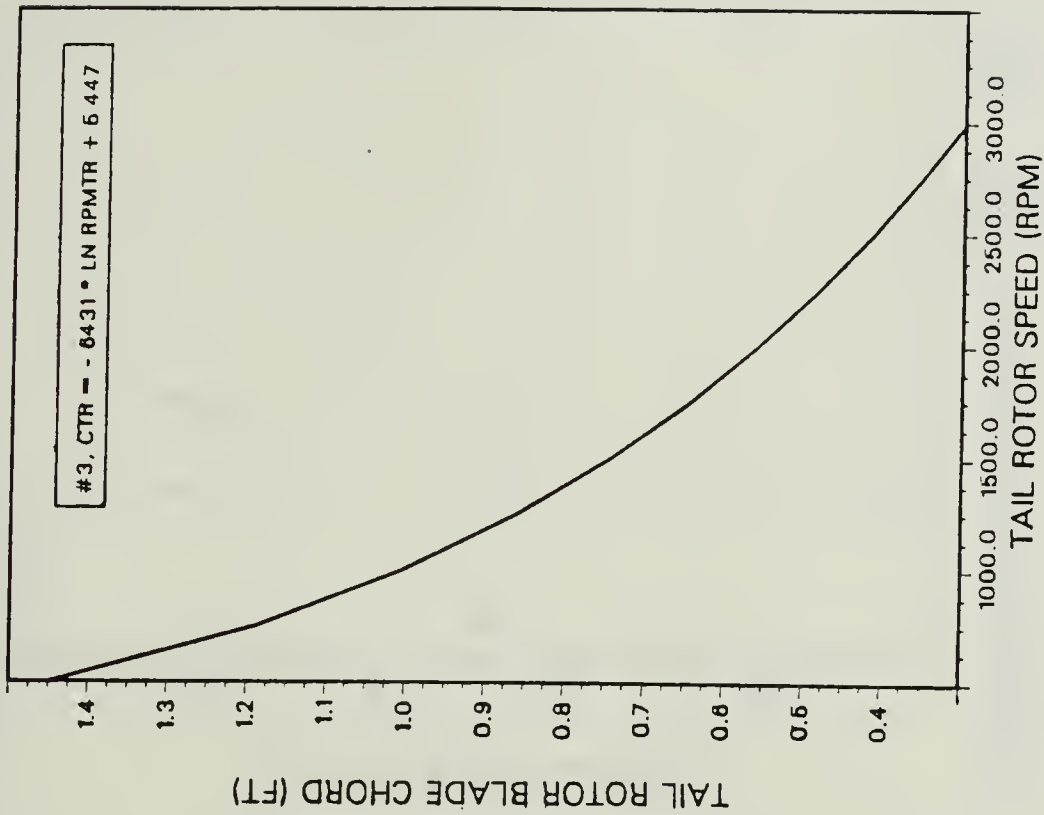


Fig. 7-9b.

Fig. 7-9a and 7-9b.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

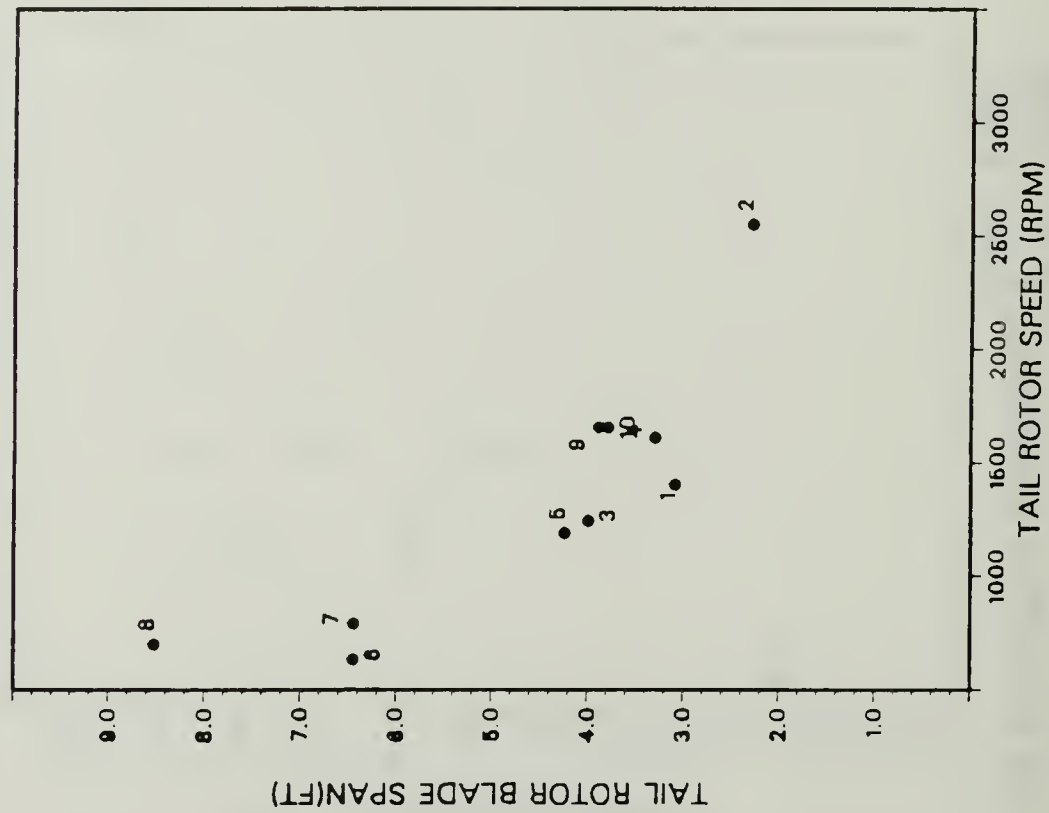


Fig. 7-11.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

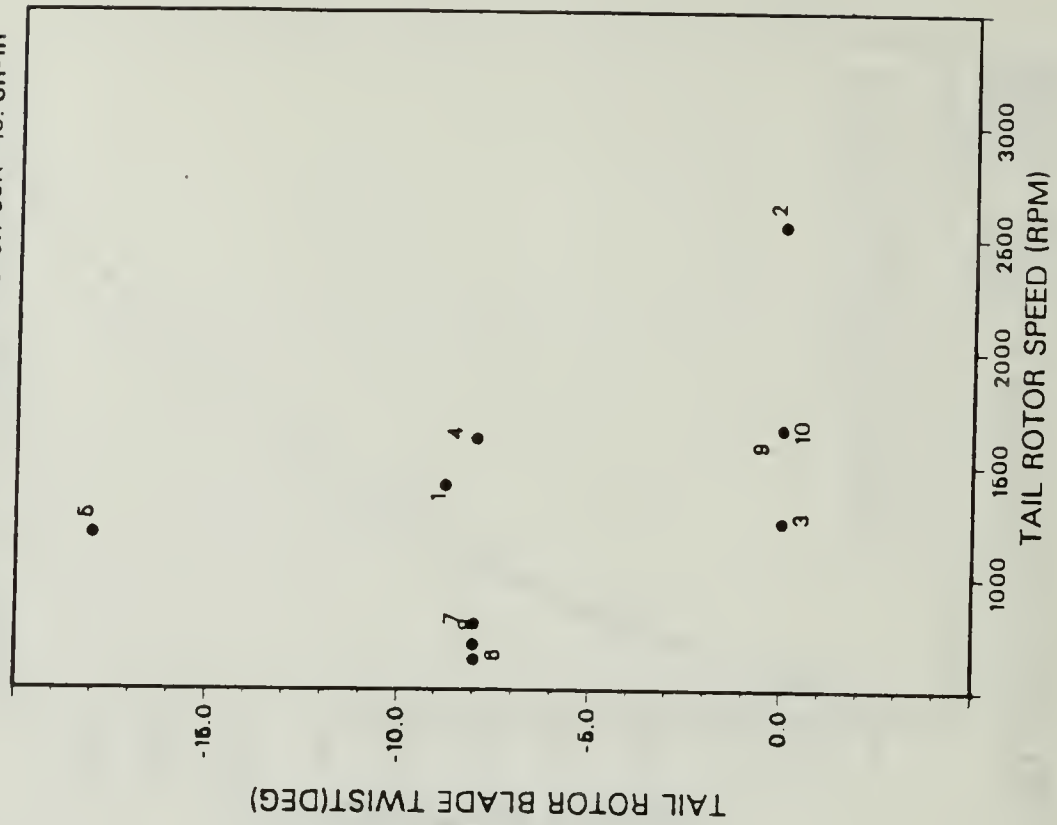


Fig. 7-13.

Fig. 7-11 and 7-13.

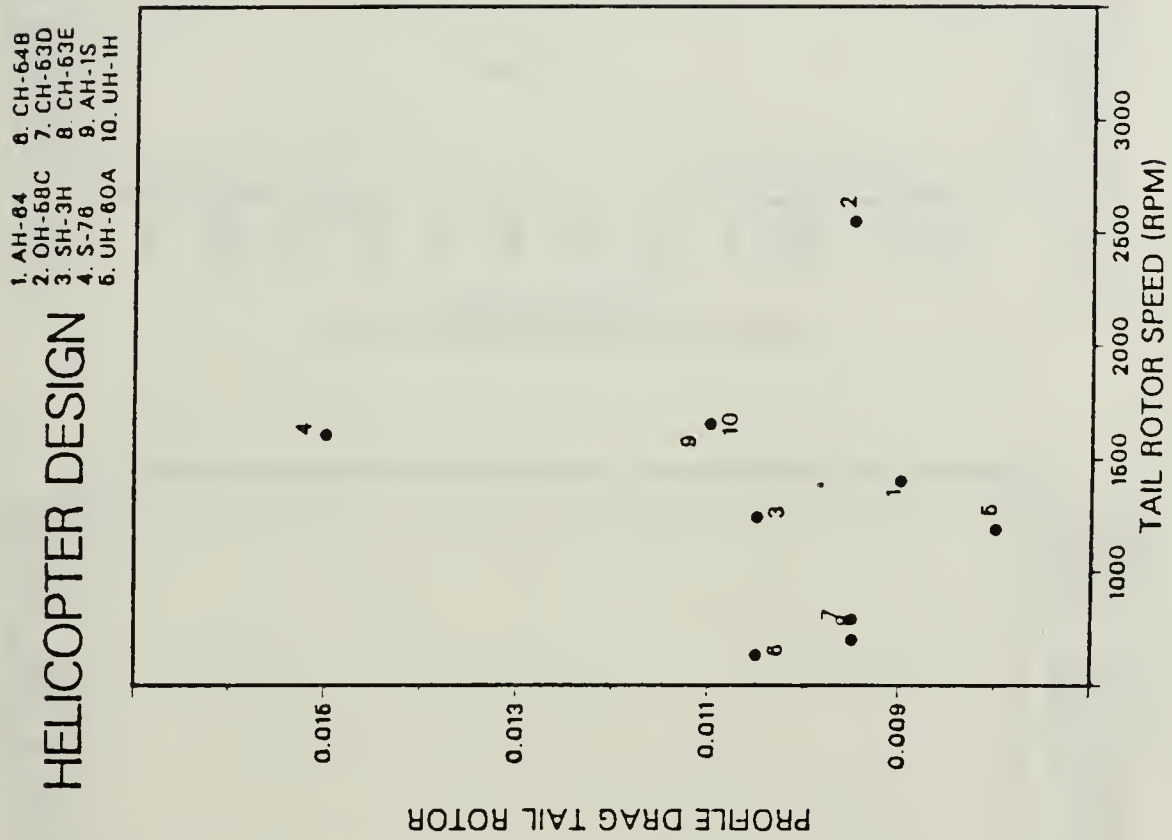


Fig. 7-15.

Fig. 7-15.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

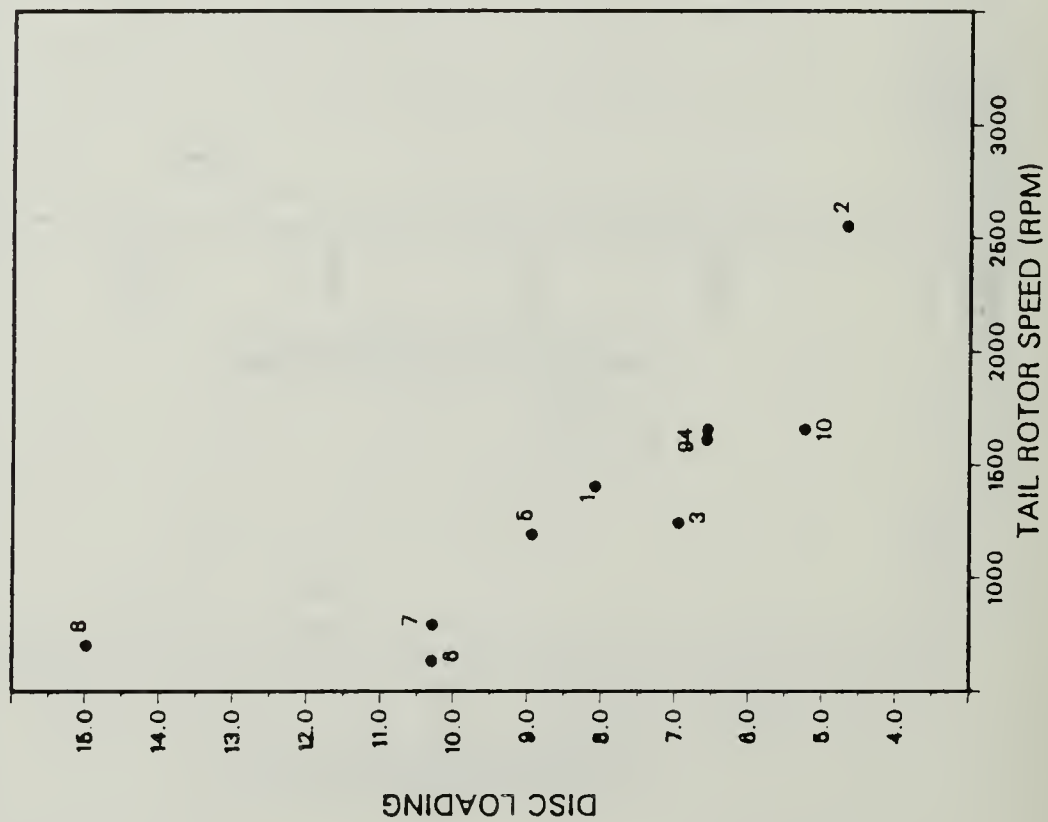


Fig. 7-16a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

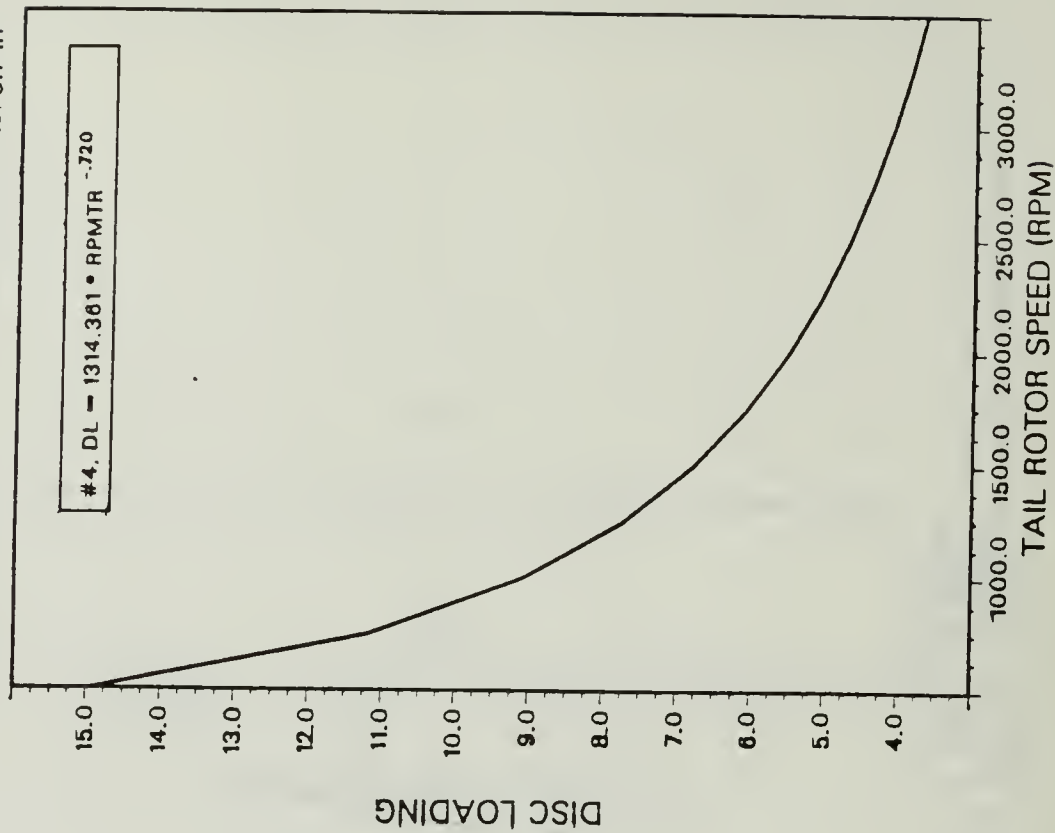


Fig. 7-16b.

Fig. 7-16a and 7-16b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
6. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

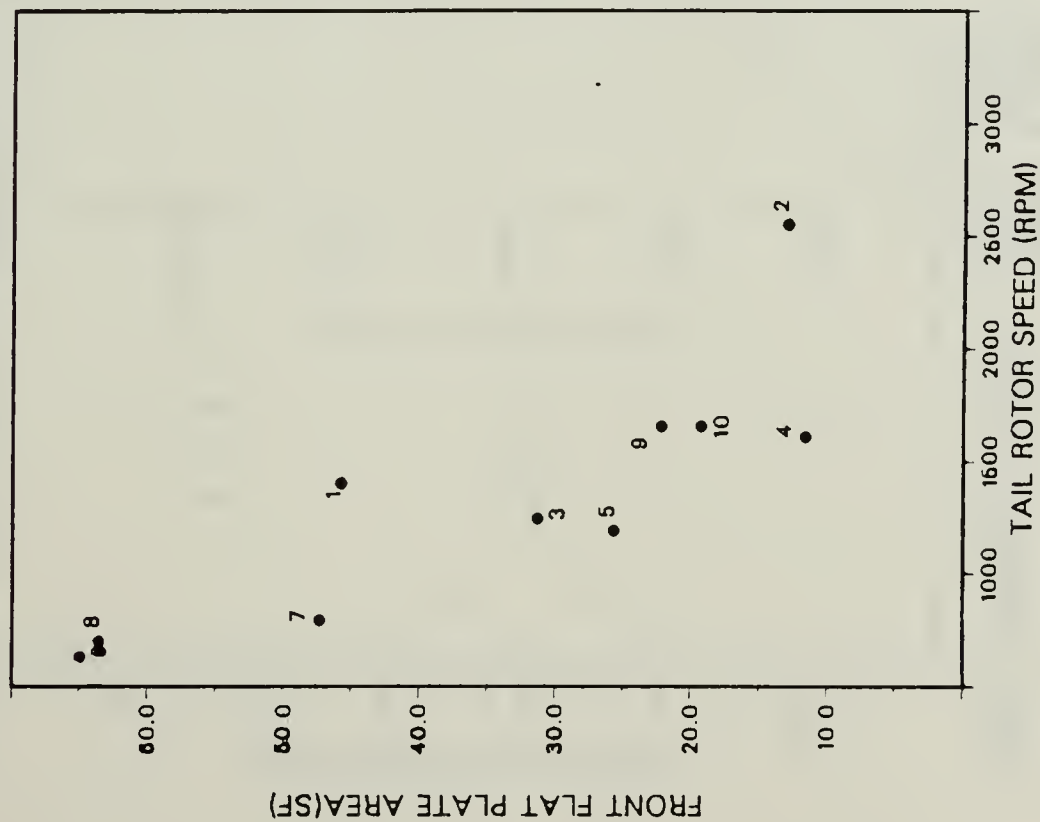


Fig. 7-19a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
6. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

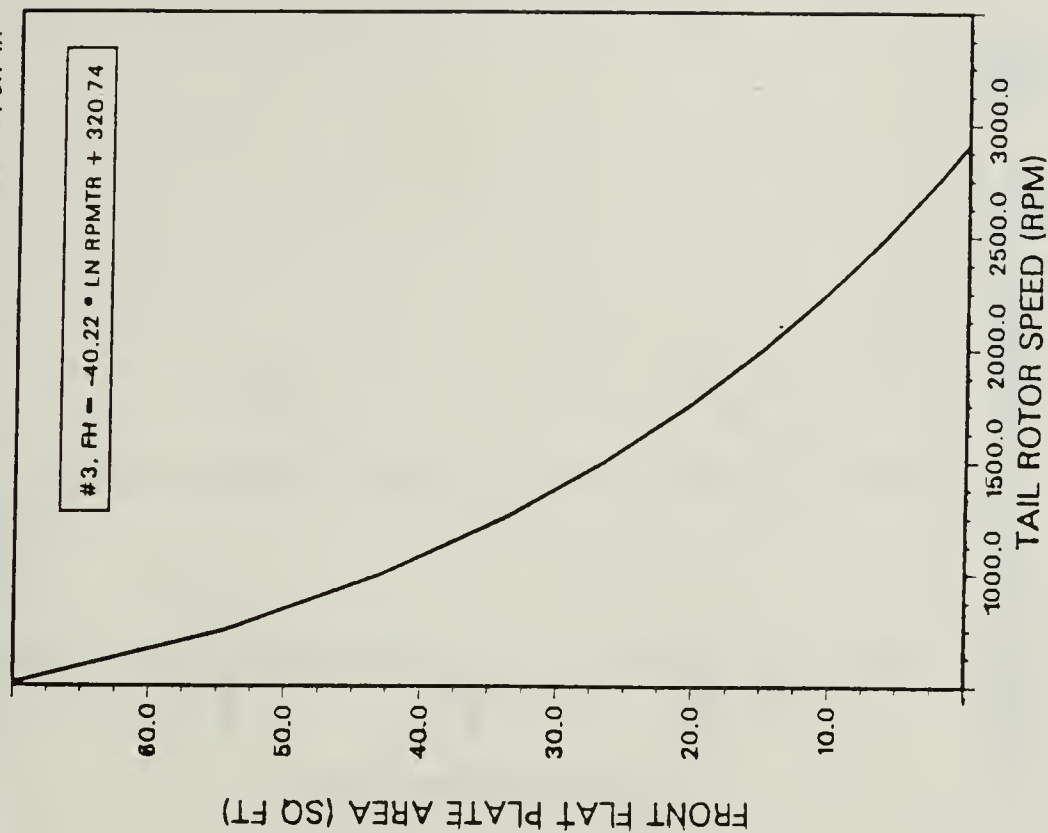


Fig. 7-19b.

Fig. 7-19a and 7-19b.

HELICOPTER DESIGN

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

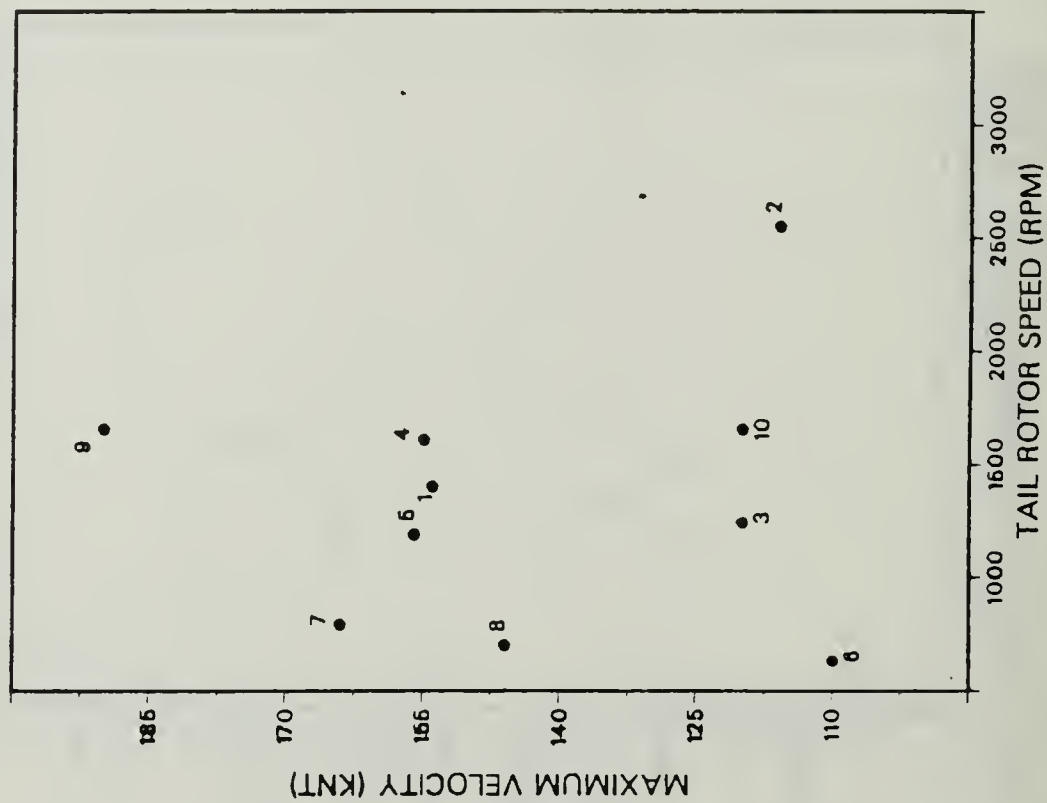


Fig. 7-21.

HELICOPTER DESIGN

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

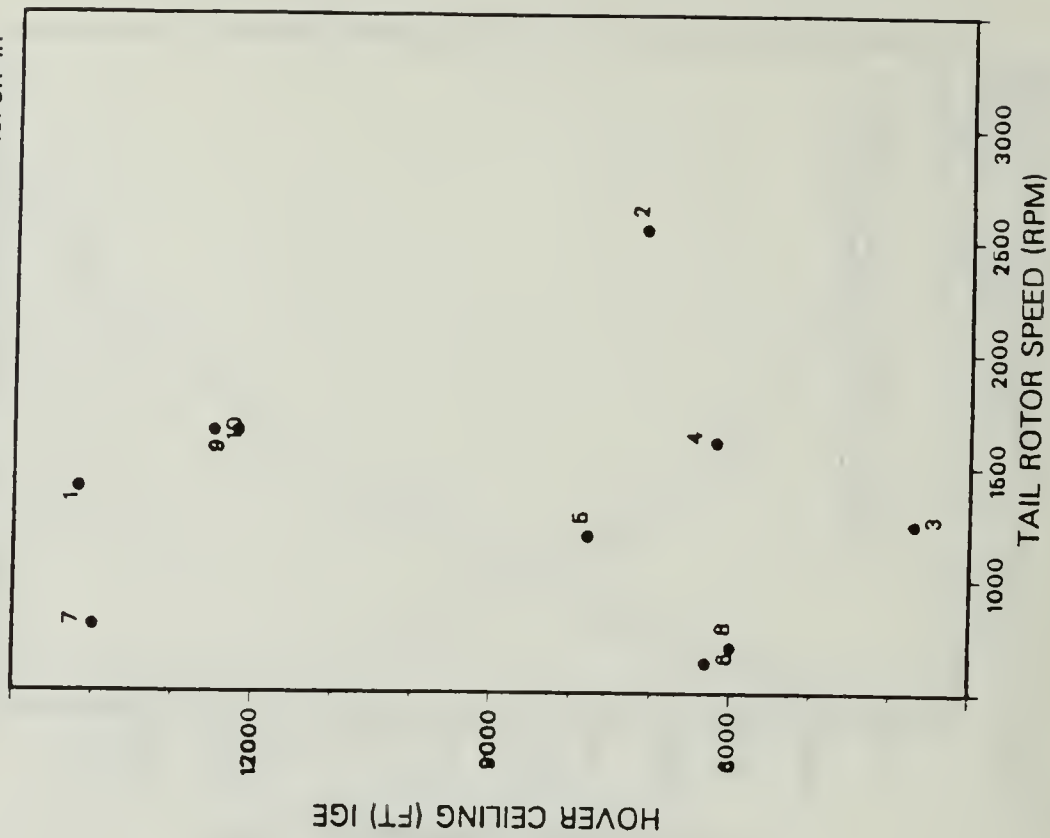


Fig. 7-24.

Fig. 7-21 and 7-24.

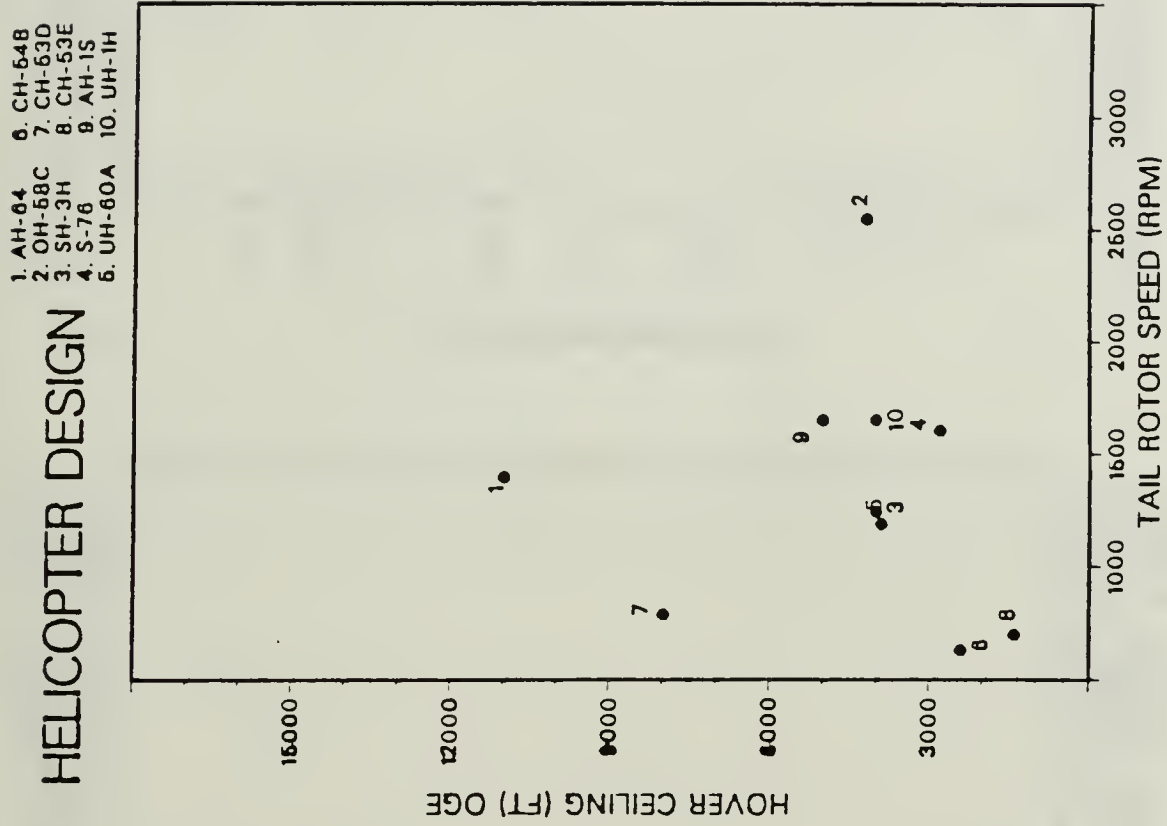


Fig. 7-25.

Fig. 7-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

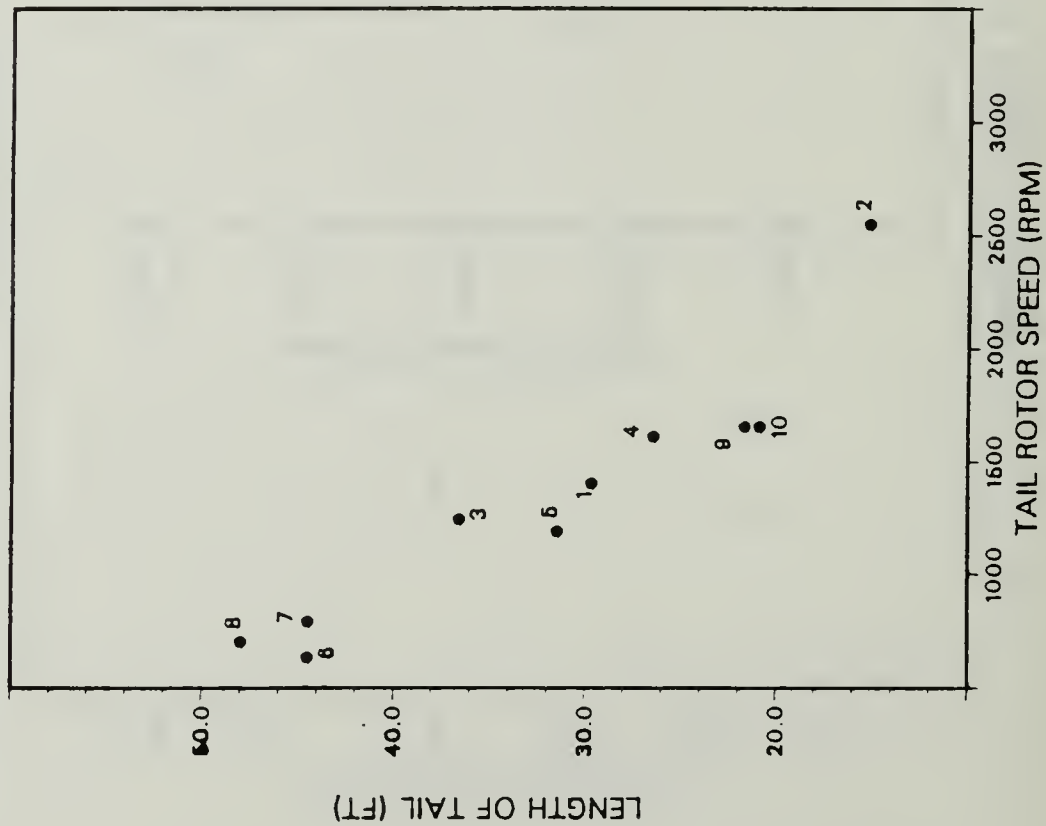


Fig. 7-26a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

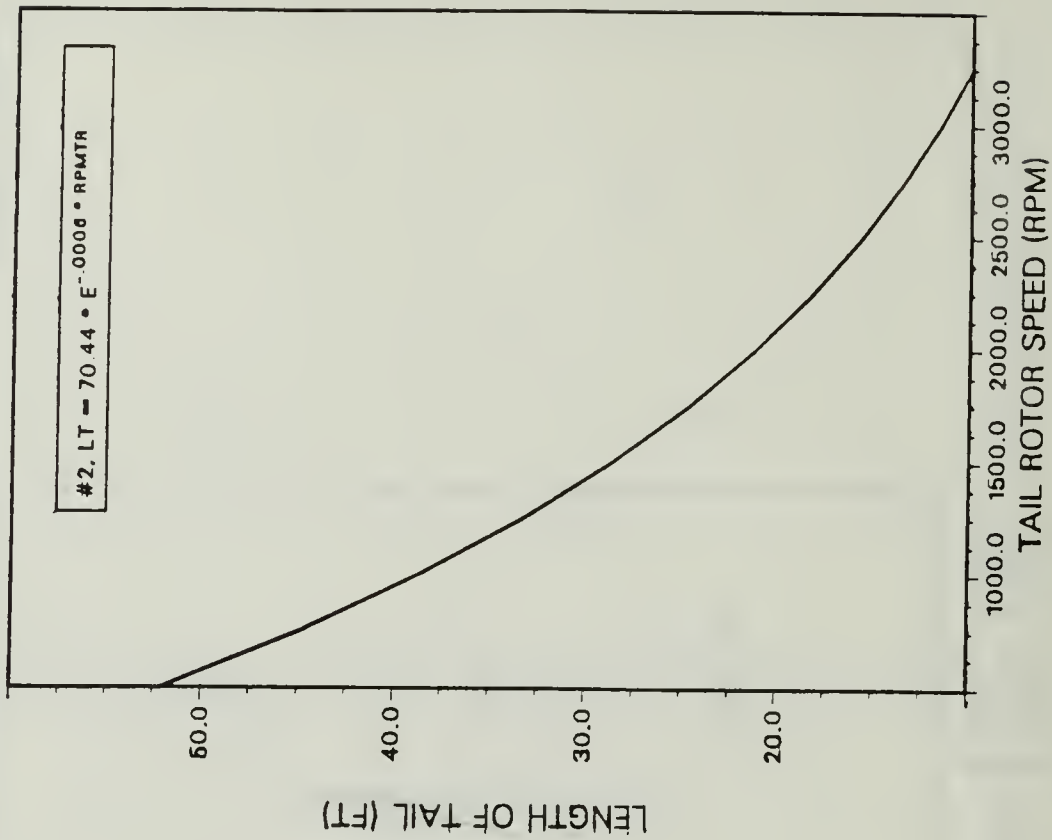


Fig. 7-26b.

Fig. 7-26a and 7-26b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

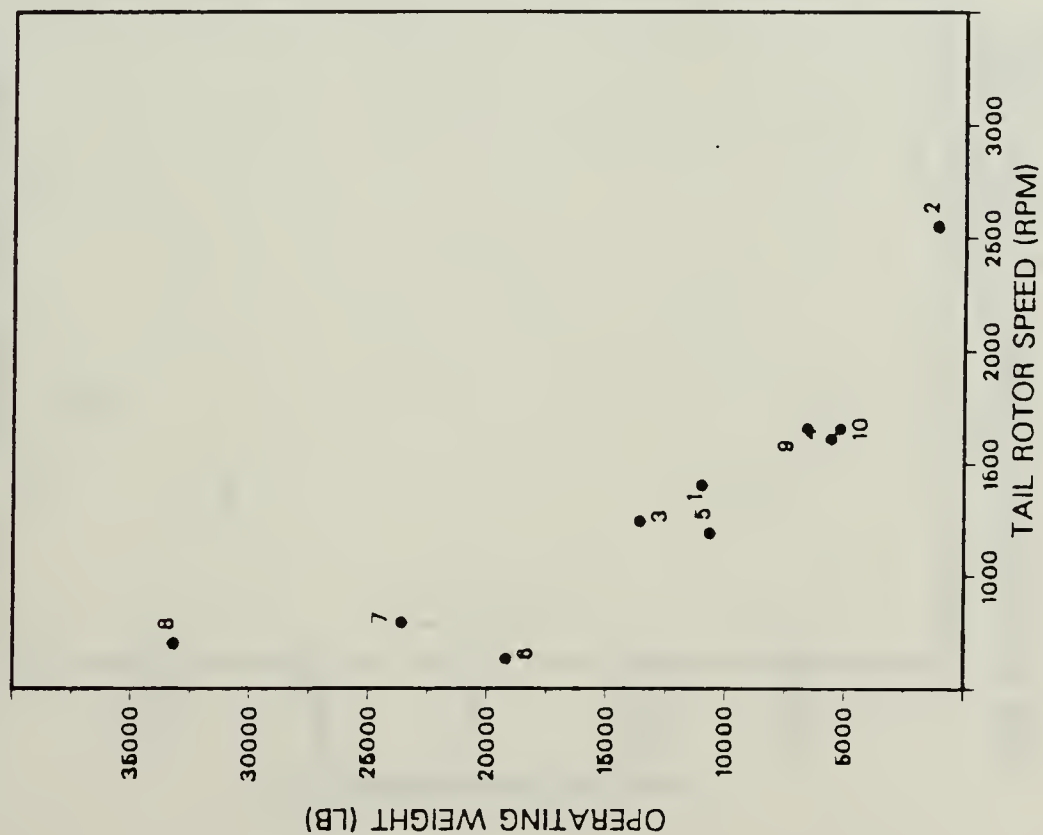


Fig. 7-27a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

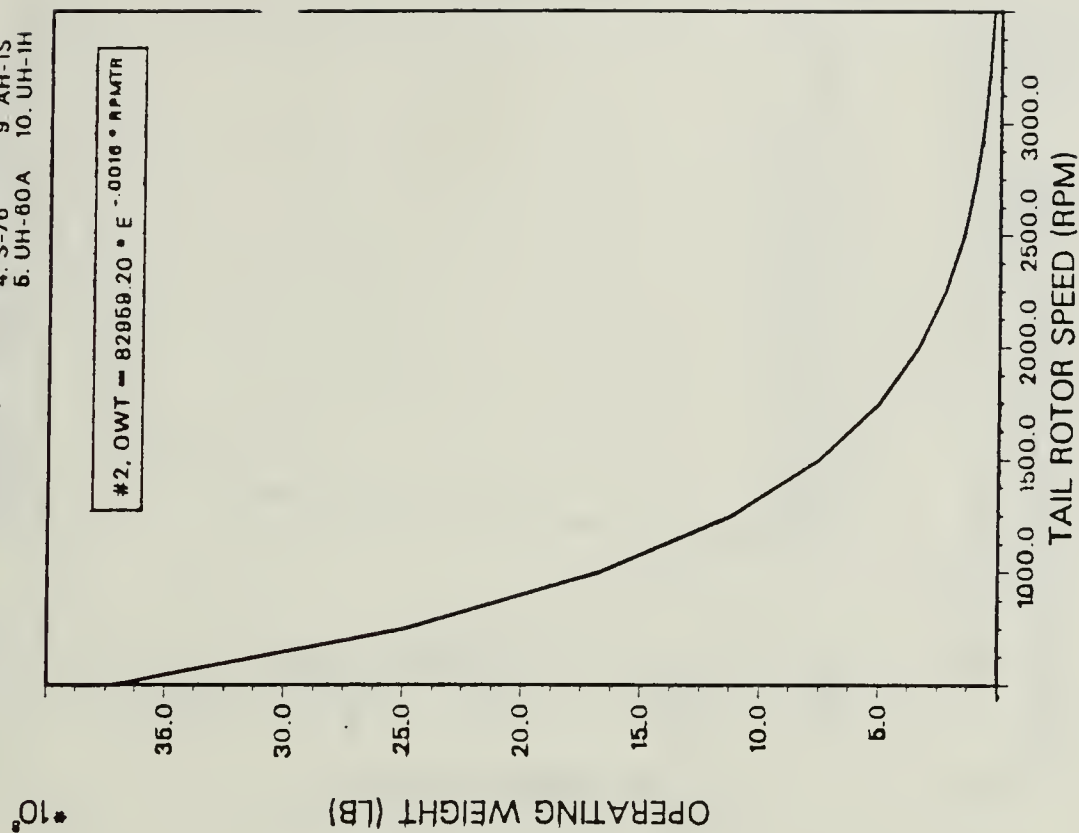


Fig. 7-27b.

Fig. 7-27a and 7-27b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

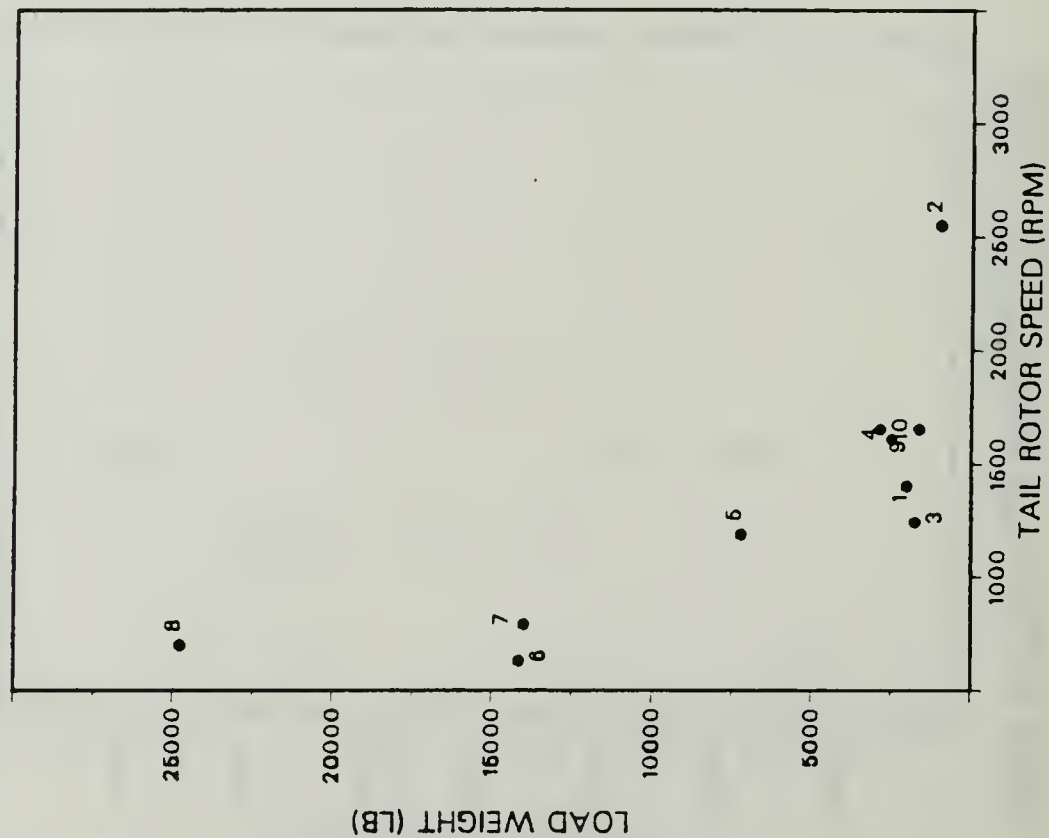


Fig. 7-28a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

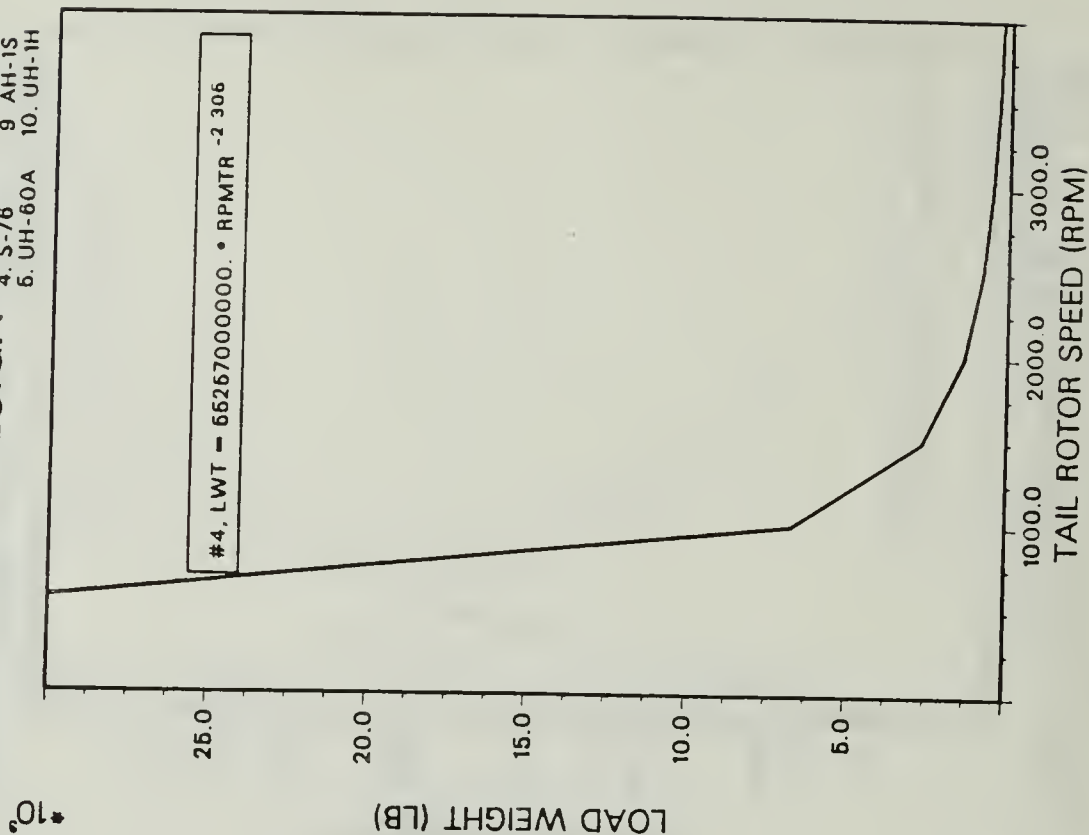


Fig. 7-28b.

Fig. 7-28a and 7-28b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

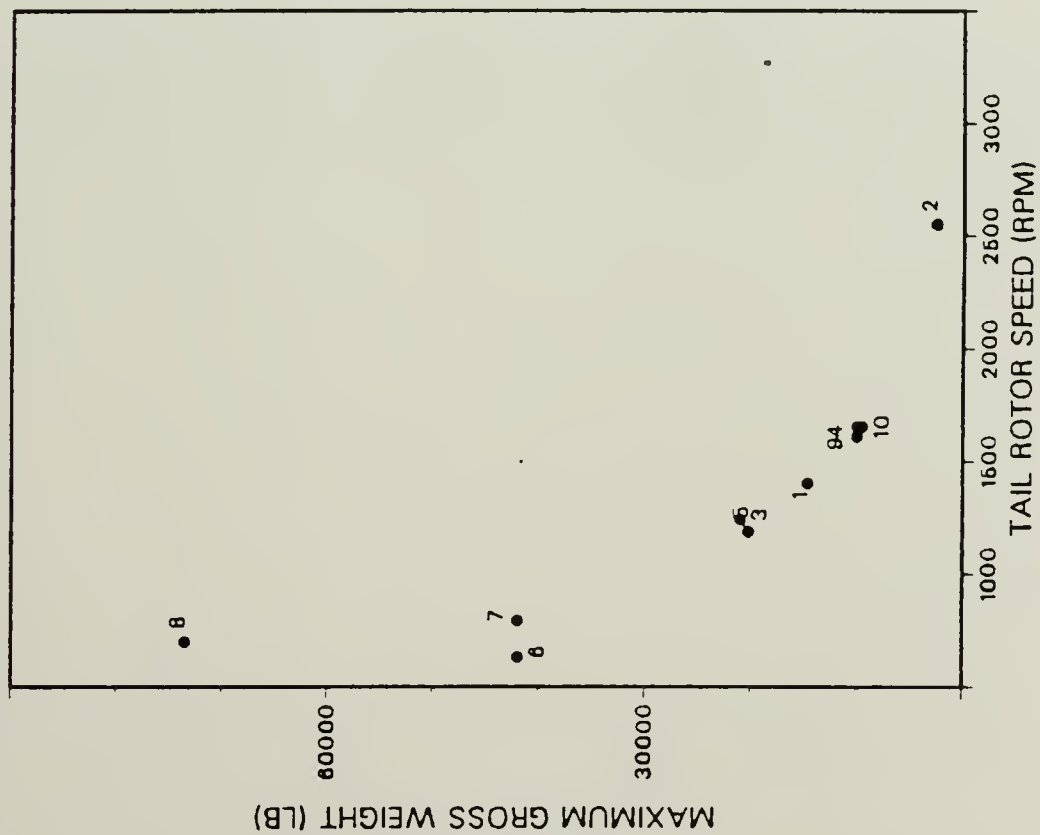


Fig. 7-30a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

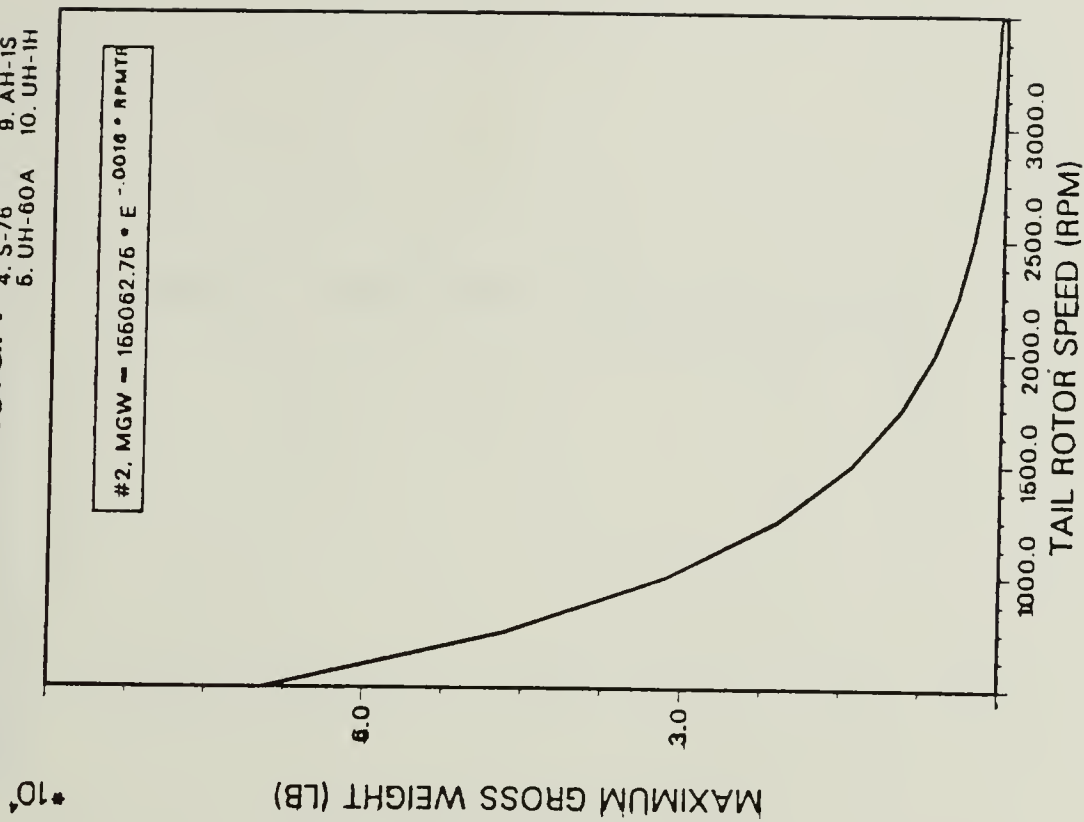


Fig. 7-30b.

Fig. 7-30a and 7-30b.



Chord of Main Rotor Blade Pairings.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

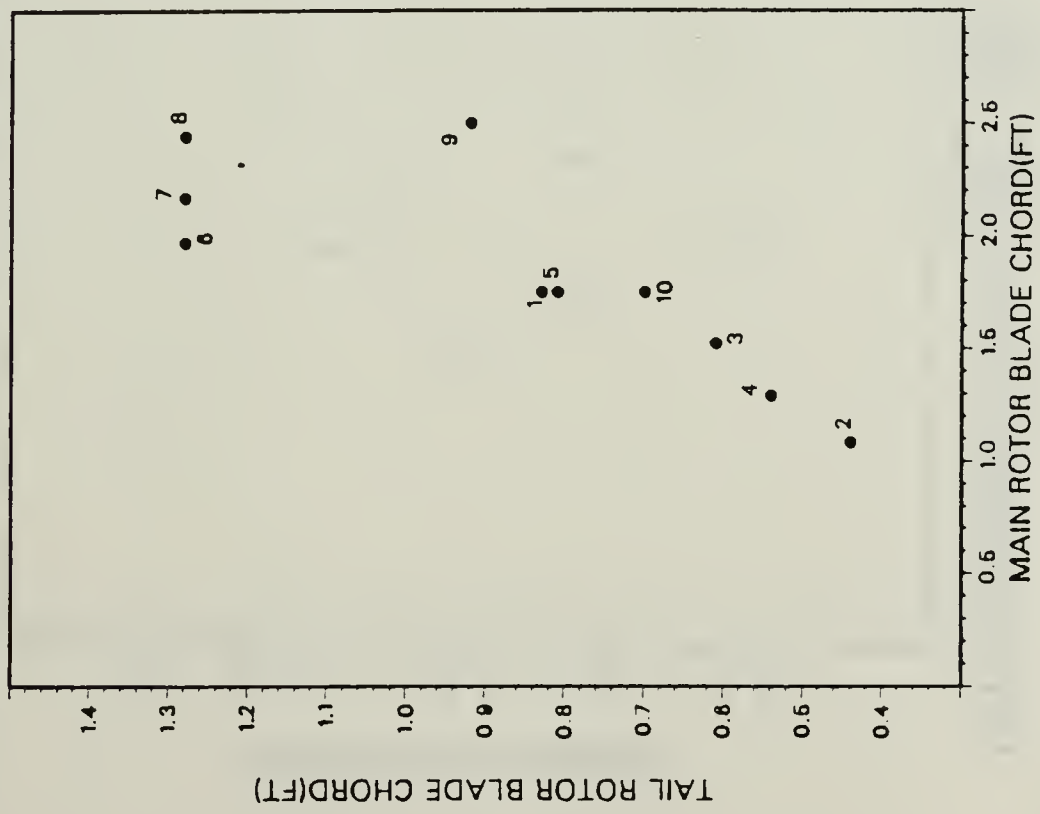


Fig. 8-9a.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

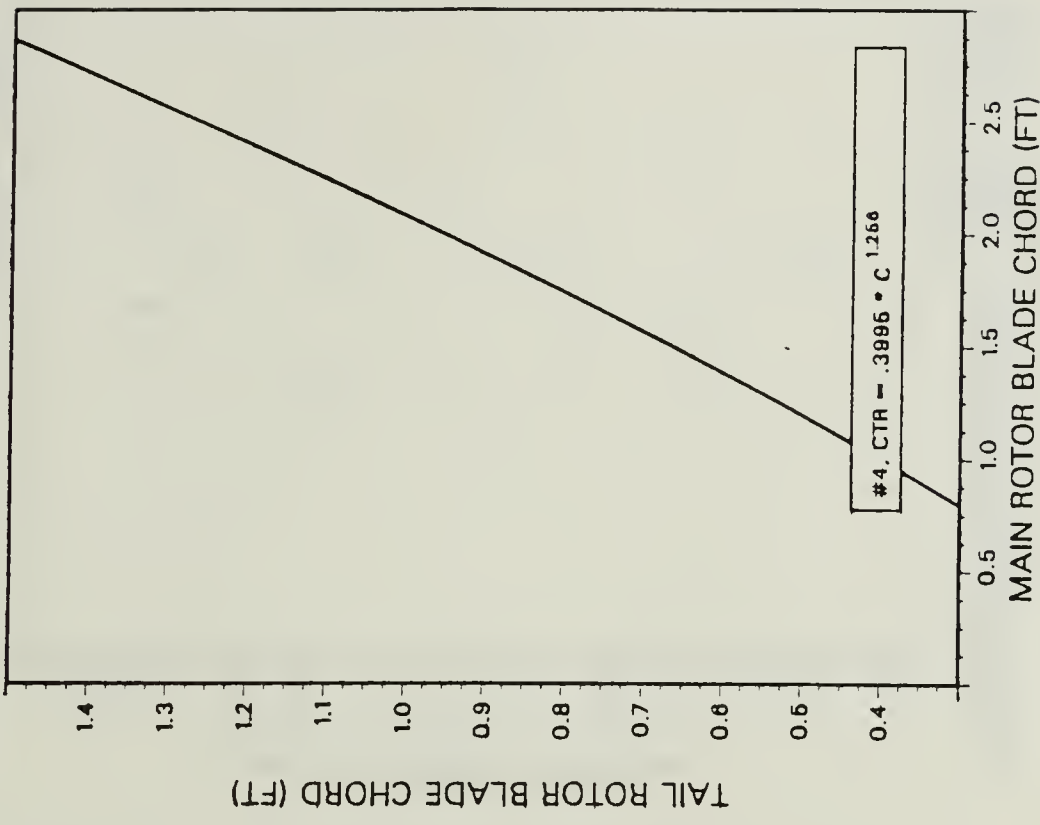


Fig. 8-9b.

Fig. 8-9a and 8-9b.

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

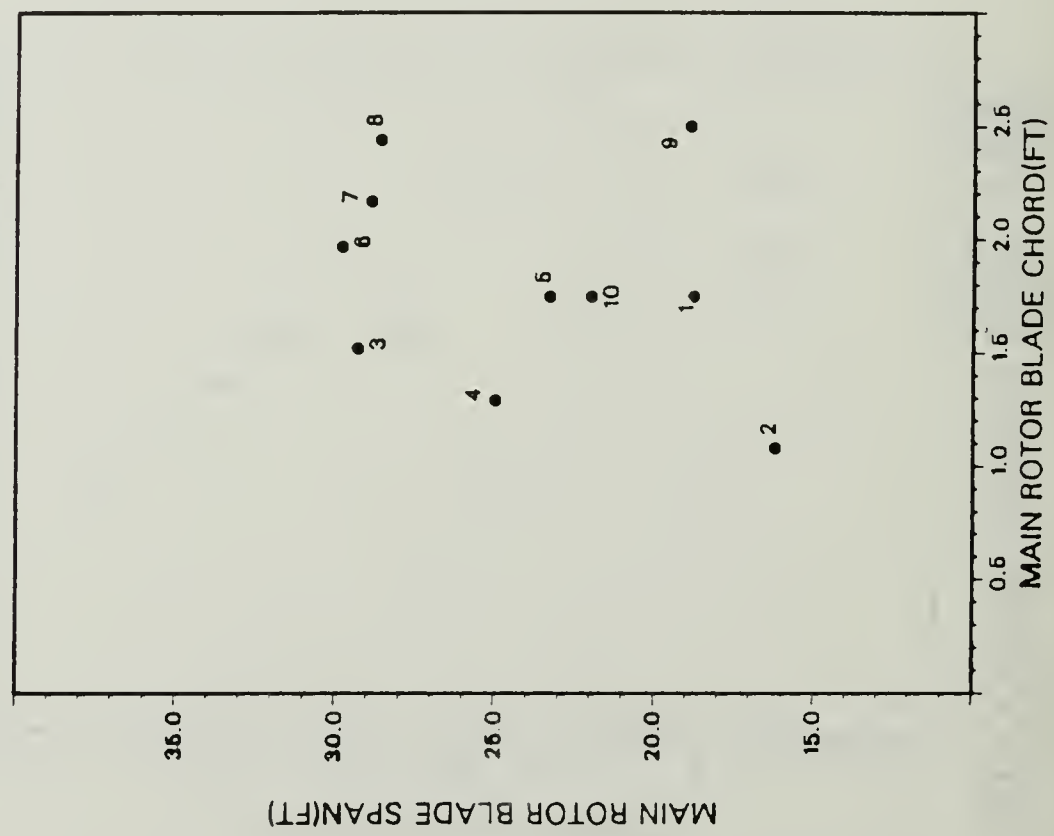


Fig. 8-10.

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-63D
- 8. CH-63E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

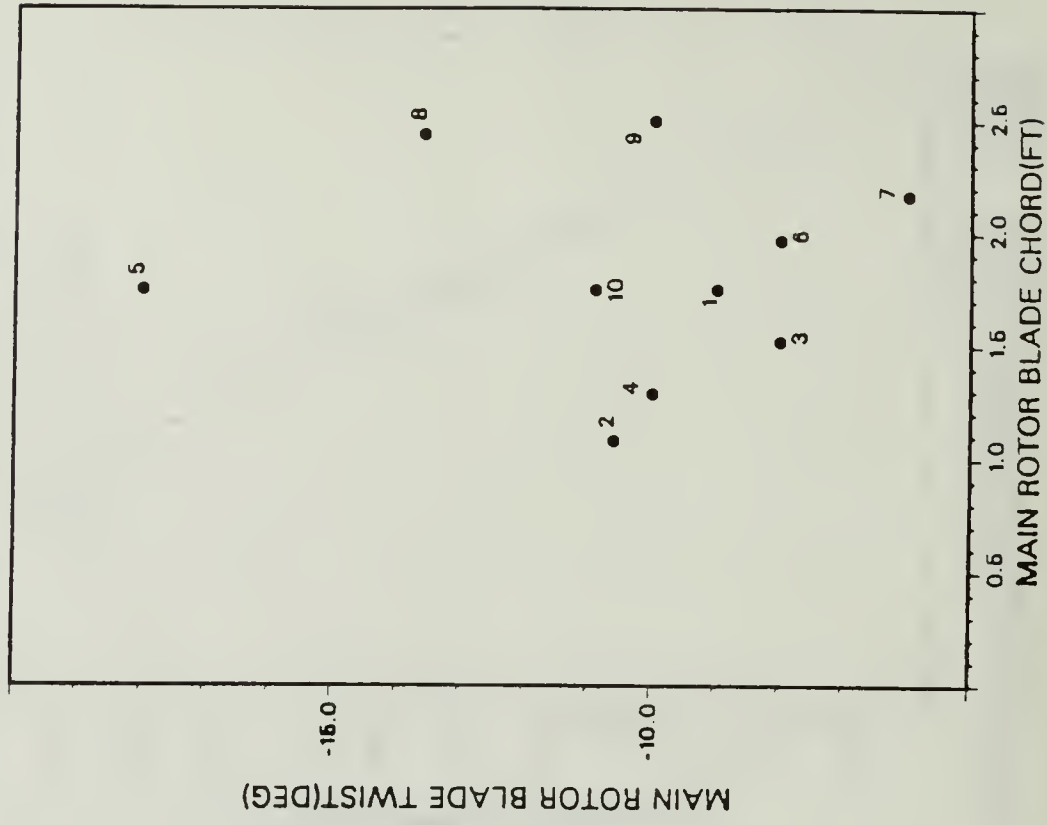


Fig. 8-12.

Fig. 8-10 and 8-12.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

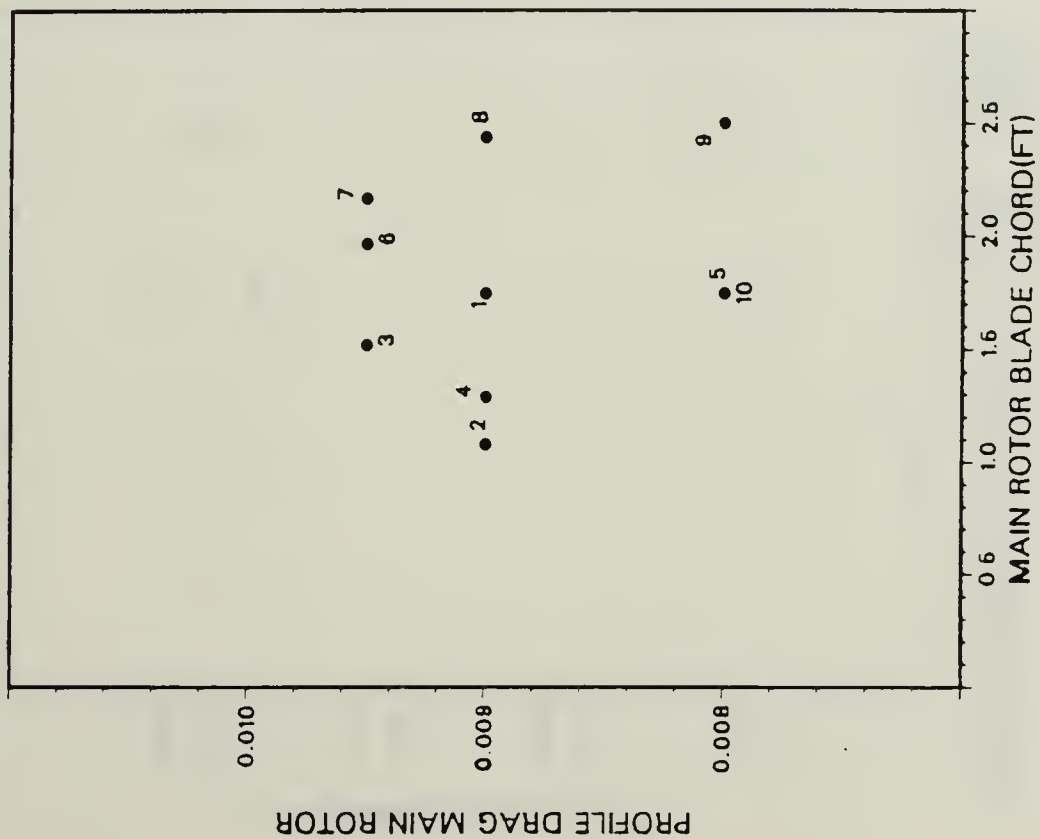


Fig. 8-14.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

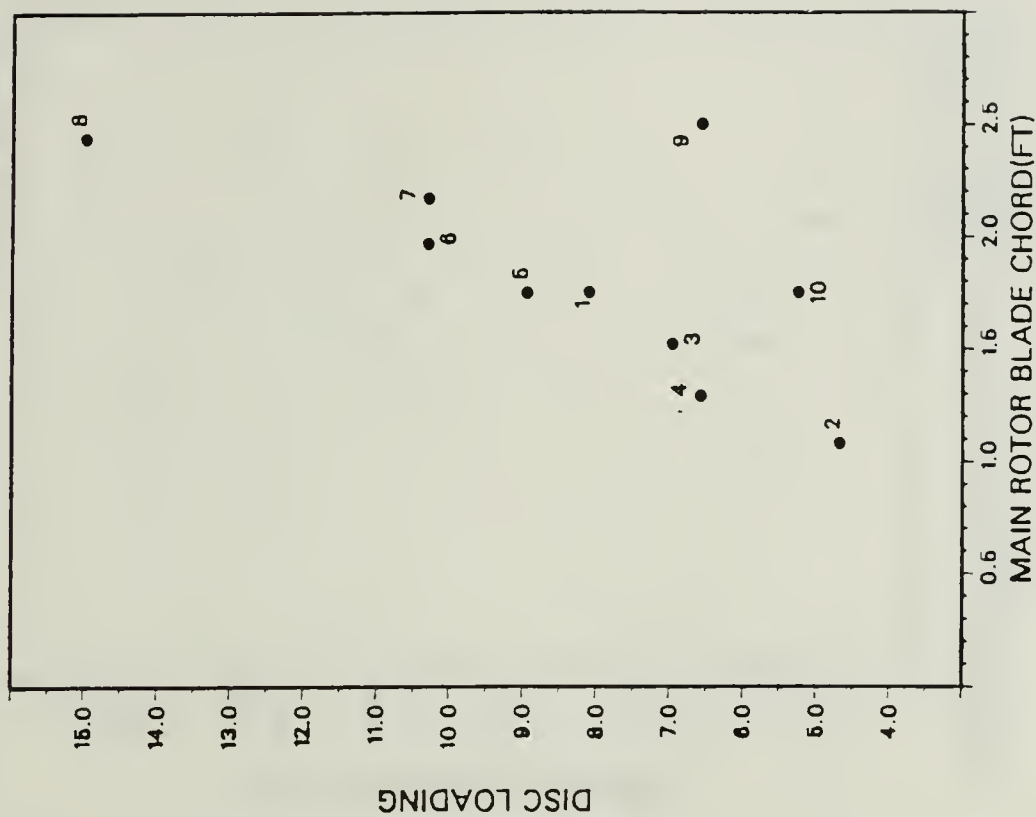


Fig. 8-16.

Fig. 8-14 and 8-16.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

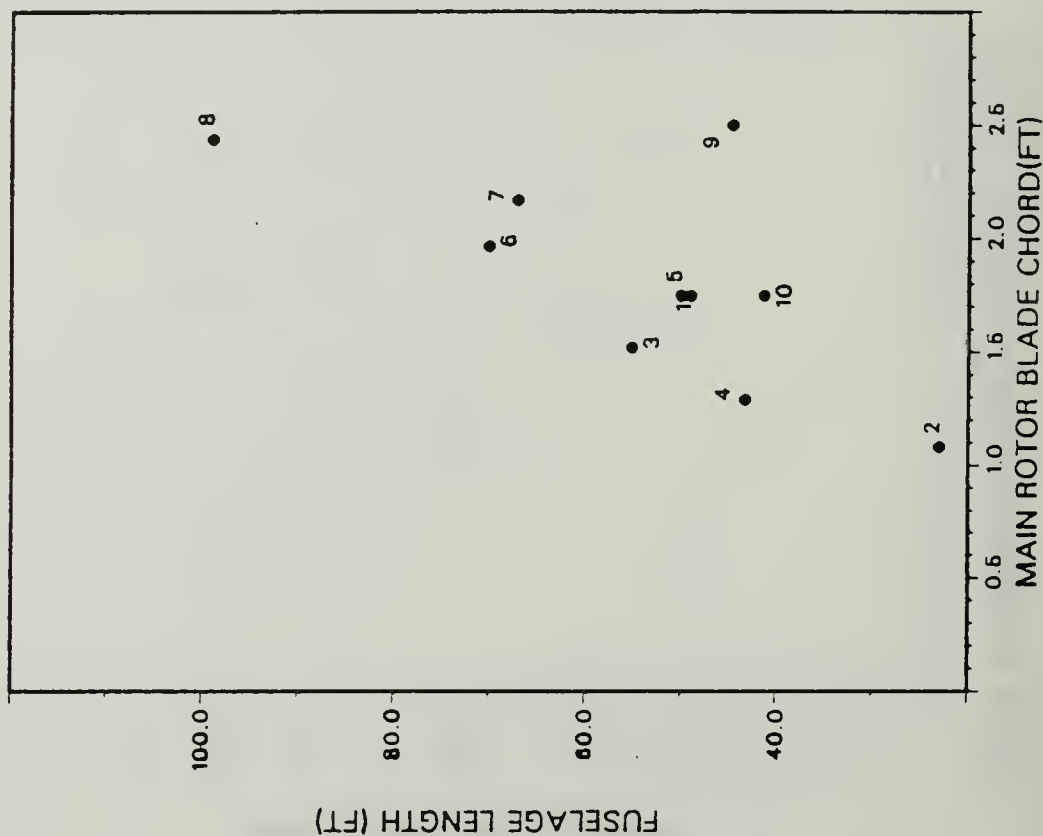


Fig. 8-18.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

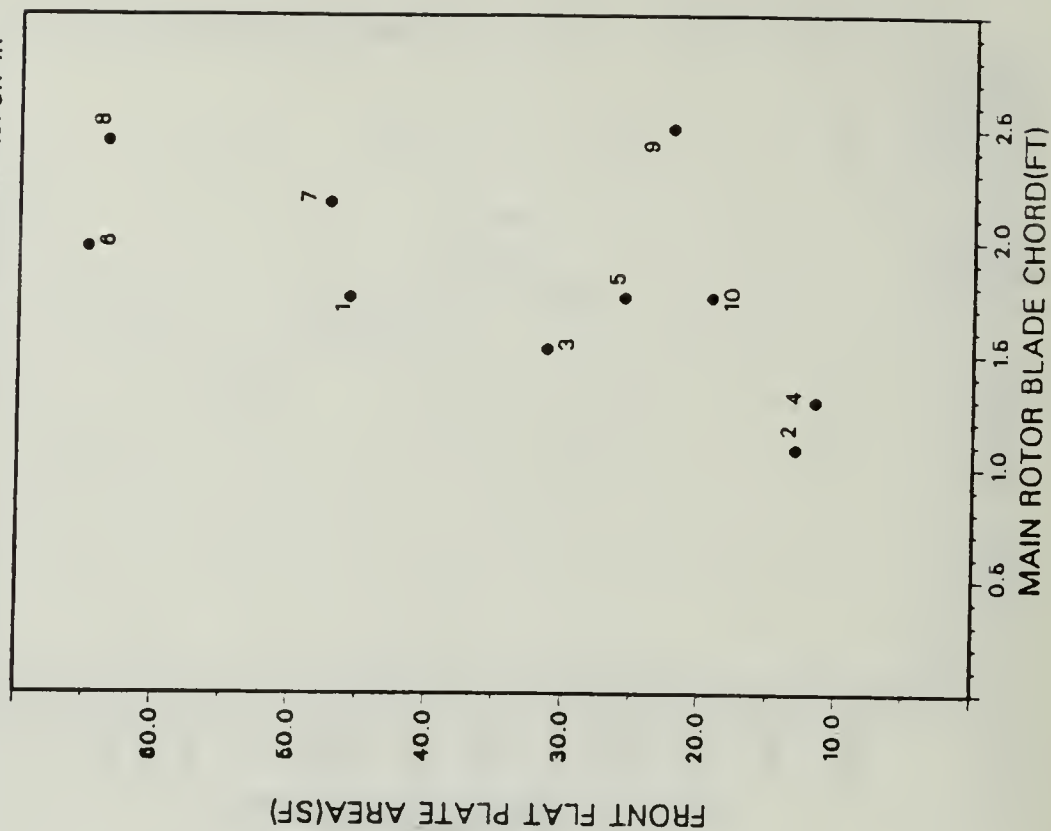


Fig. 8-19.

Fig. 8-18 and 8-19.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

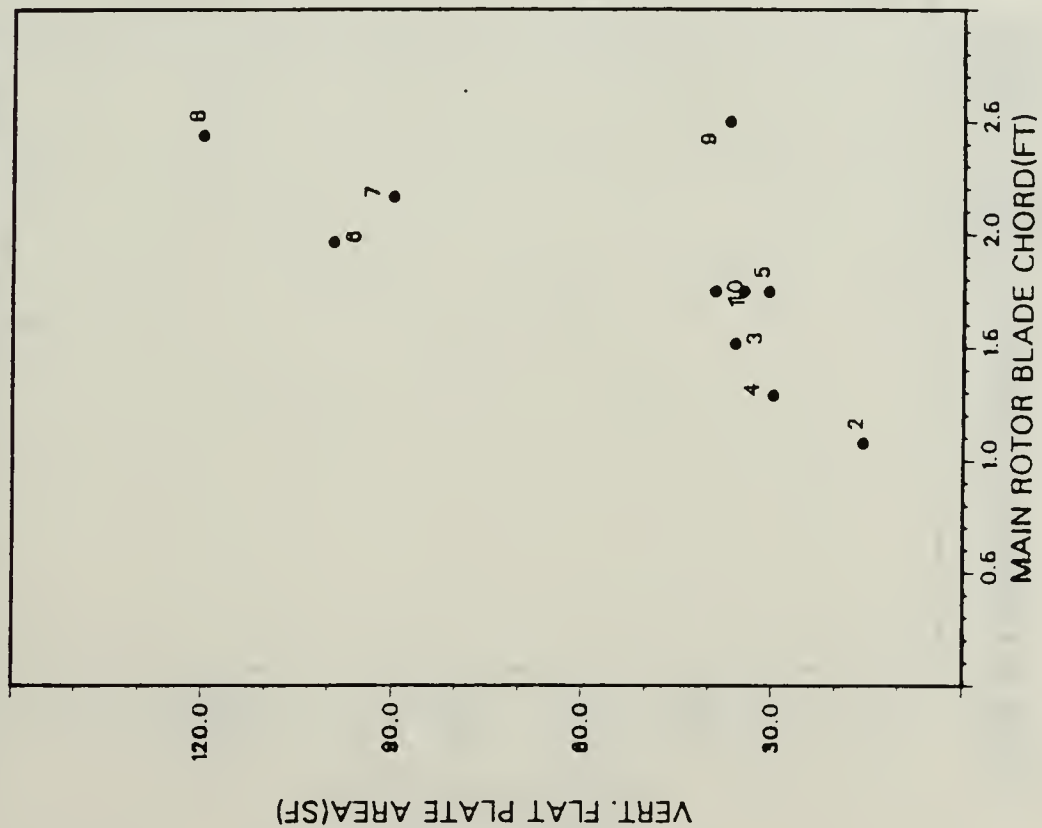


Fig. 8-20.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

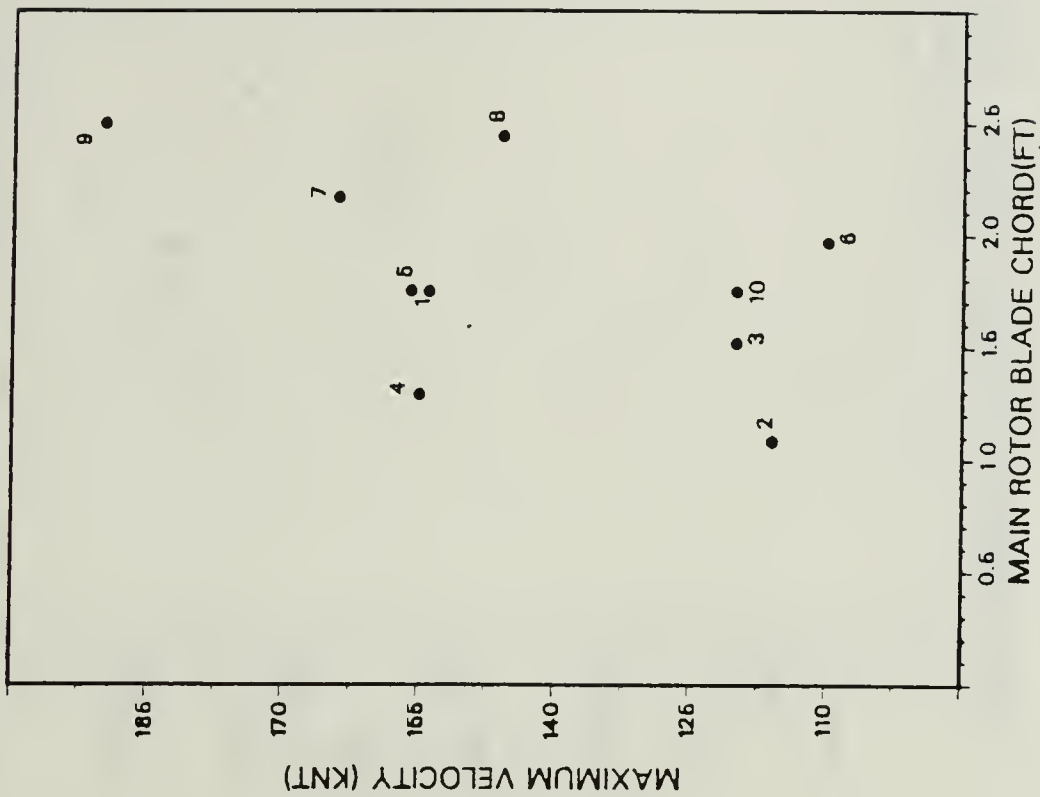


Fig. 8-21.

Fig. 8-20 and 8-21.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

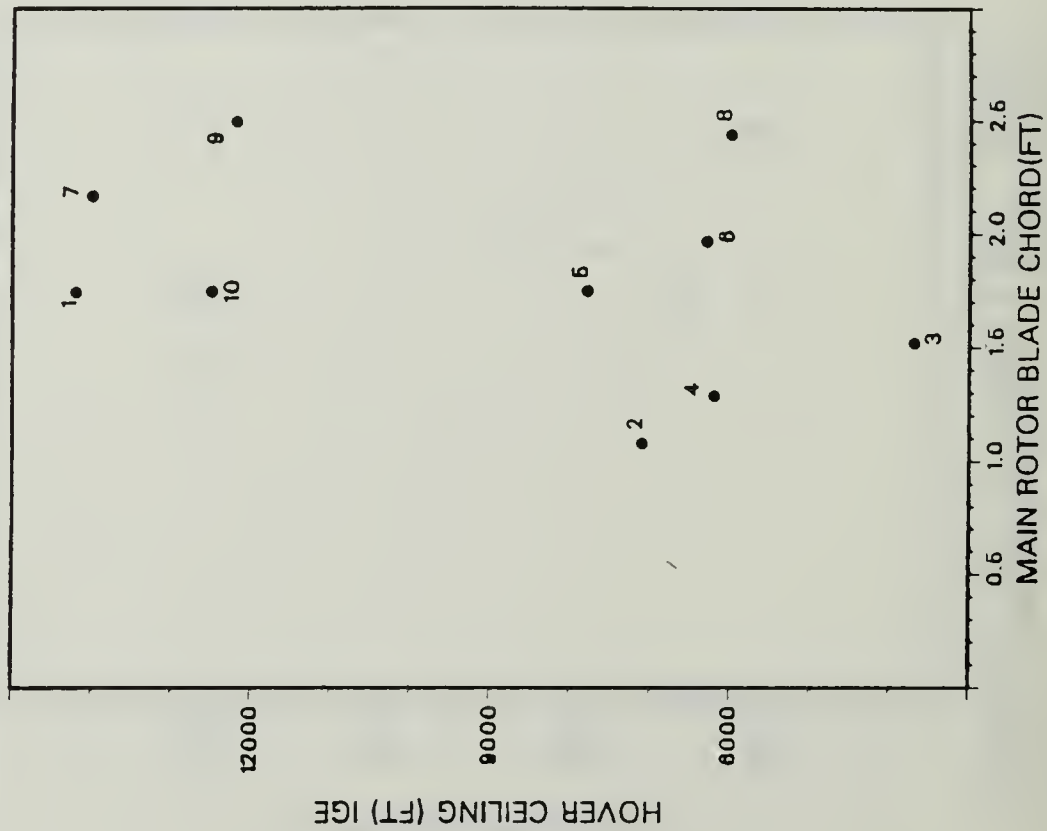


Fig. 8-24.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

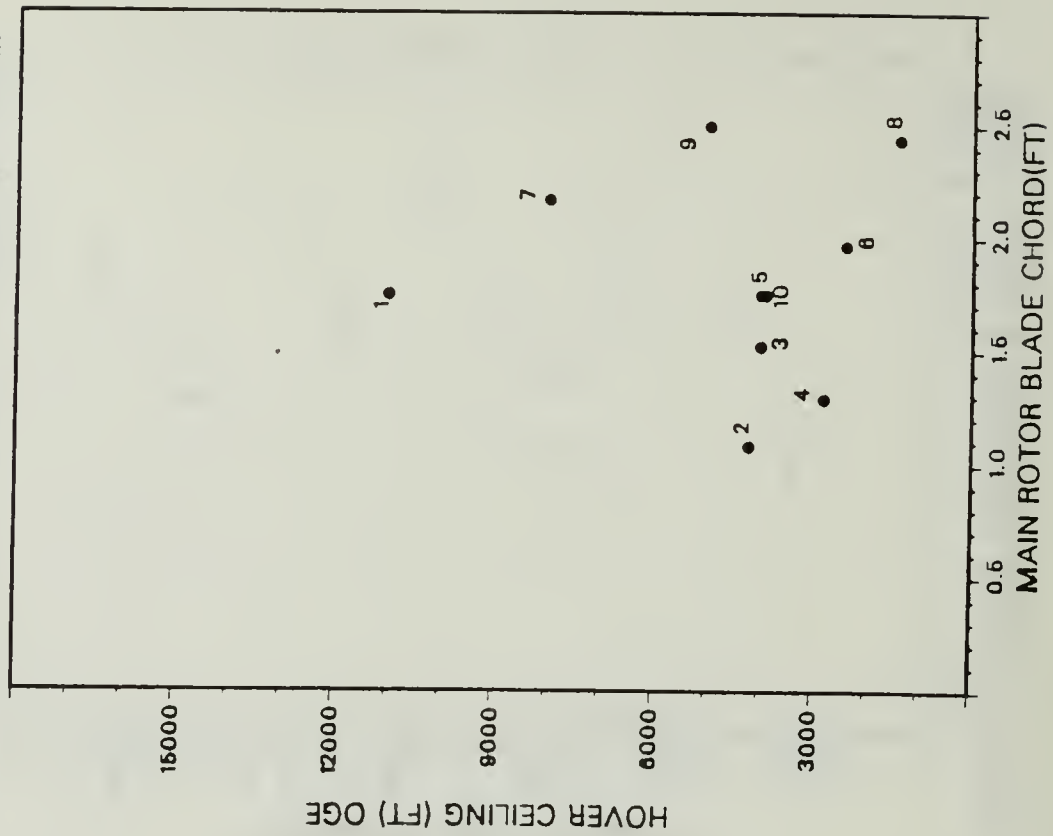


Fig. 8-25.

Fig. 8-24 and 8-25.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

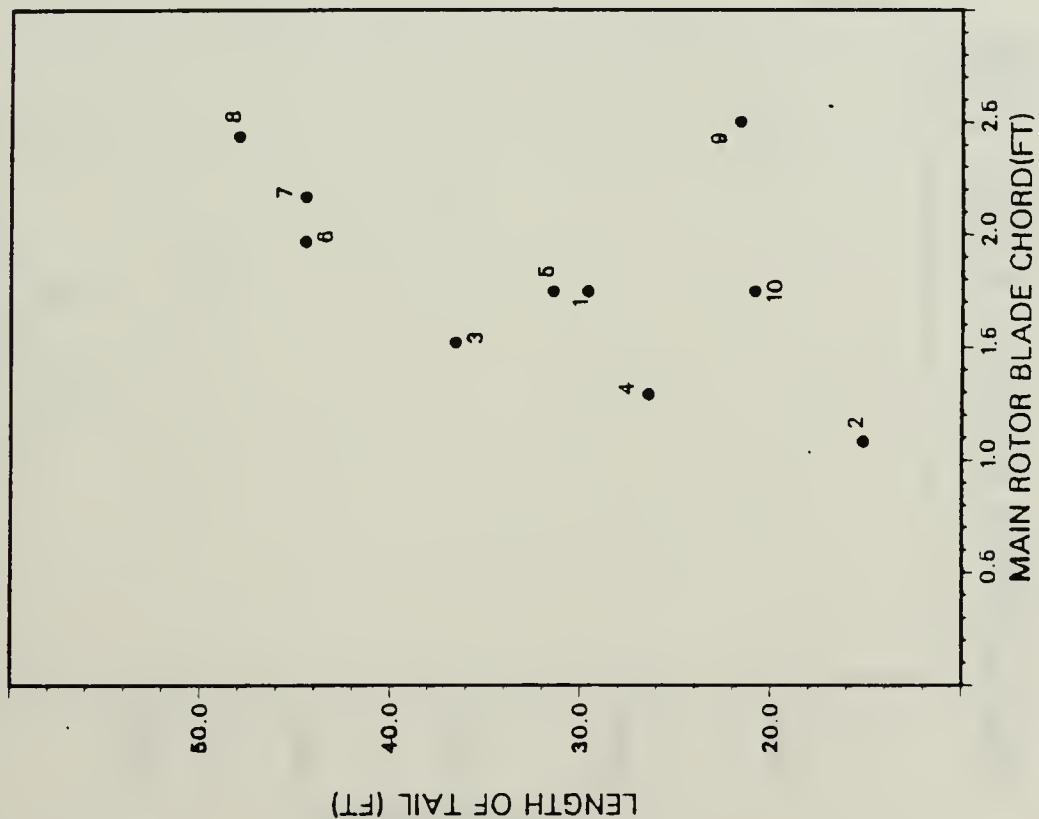


Fig. 8-26.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

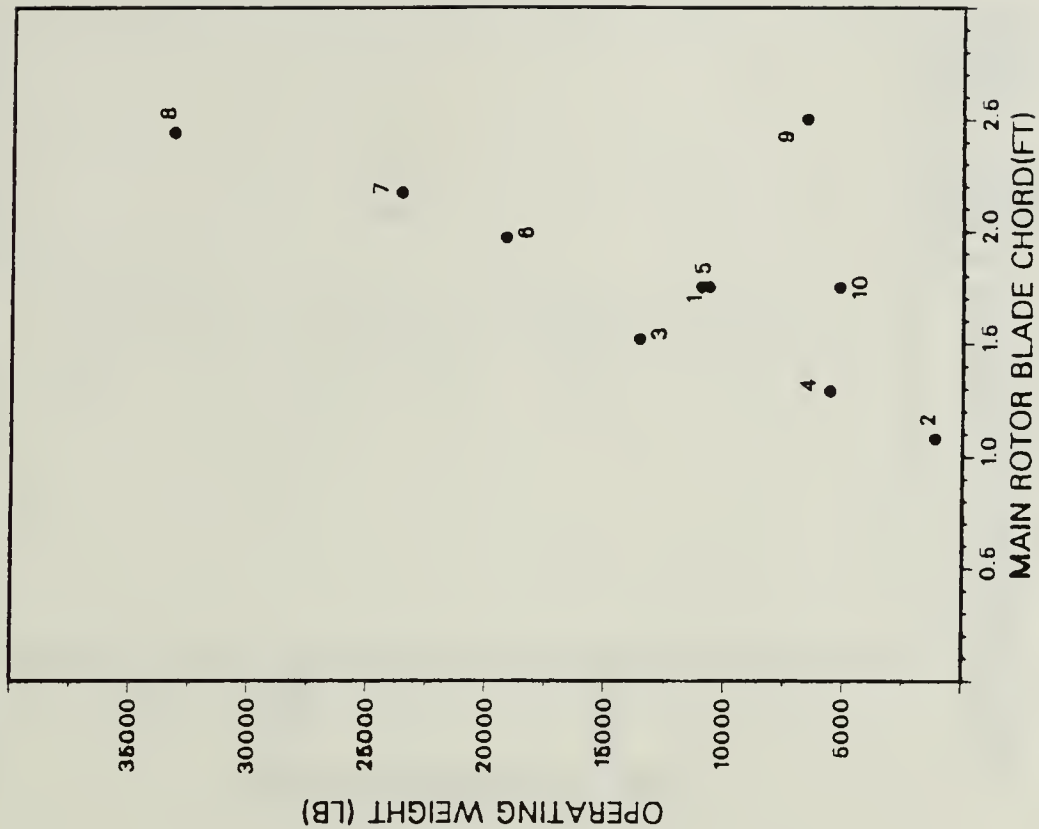


Fig. 8-27.

Fig. 8-26 and 8-27.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

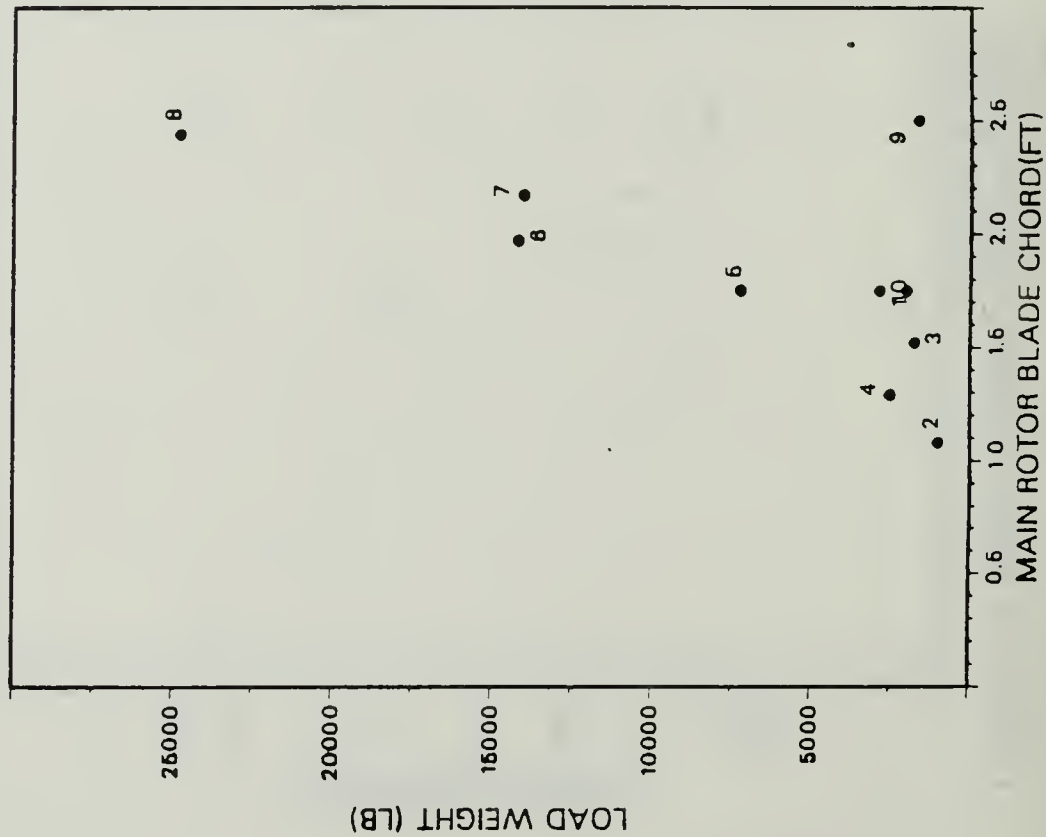


Fig. 8-28.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

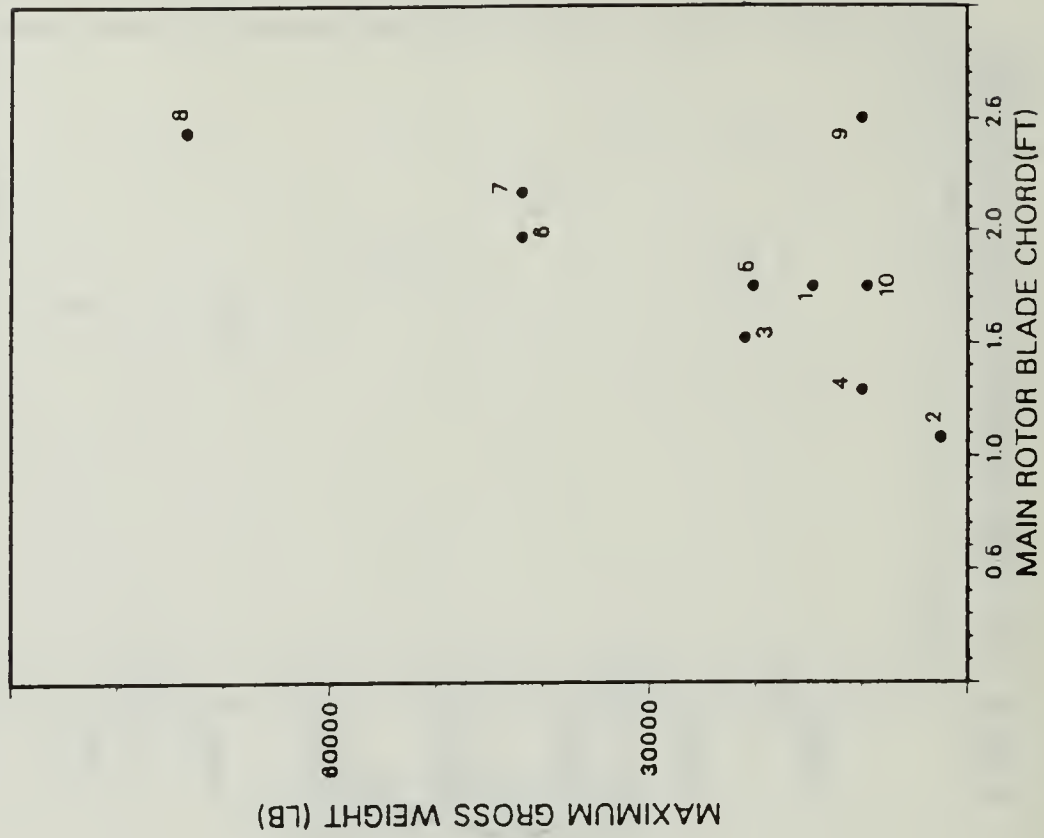


Fig. 8-30.

Fig. 8-28 and 8-30.

Chord of Tail Rotor Blade Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

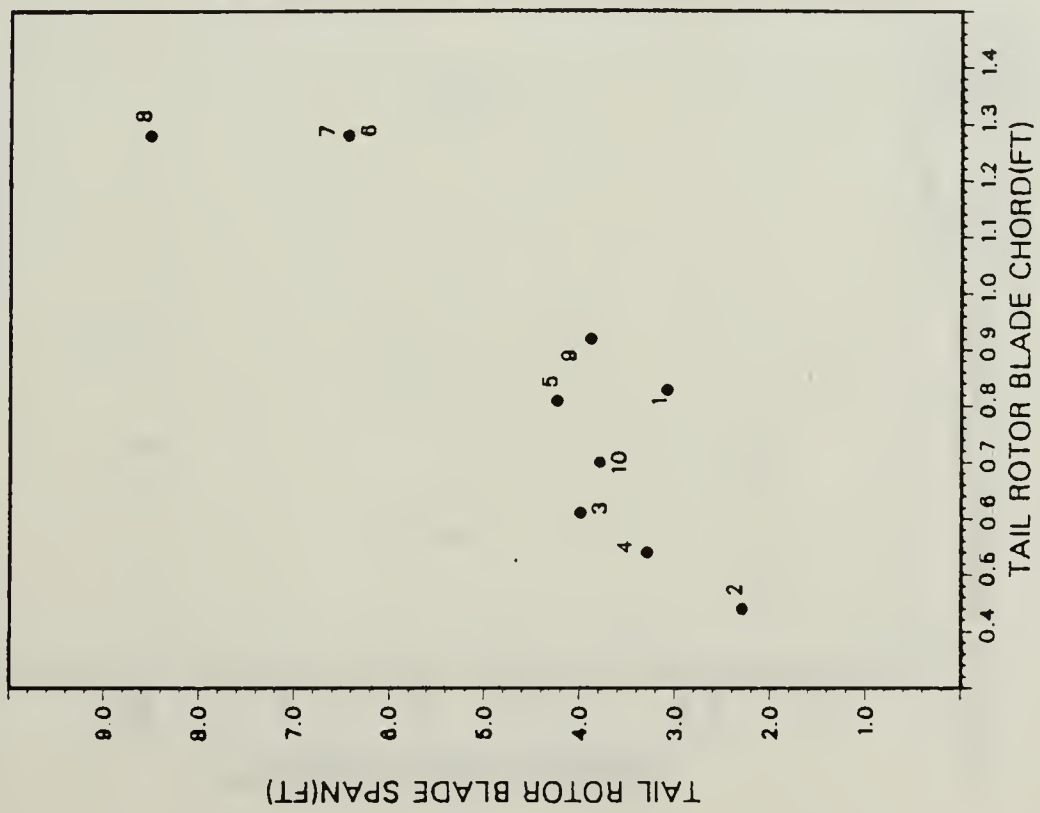


Fig. 9-11a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

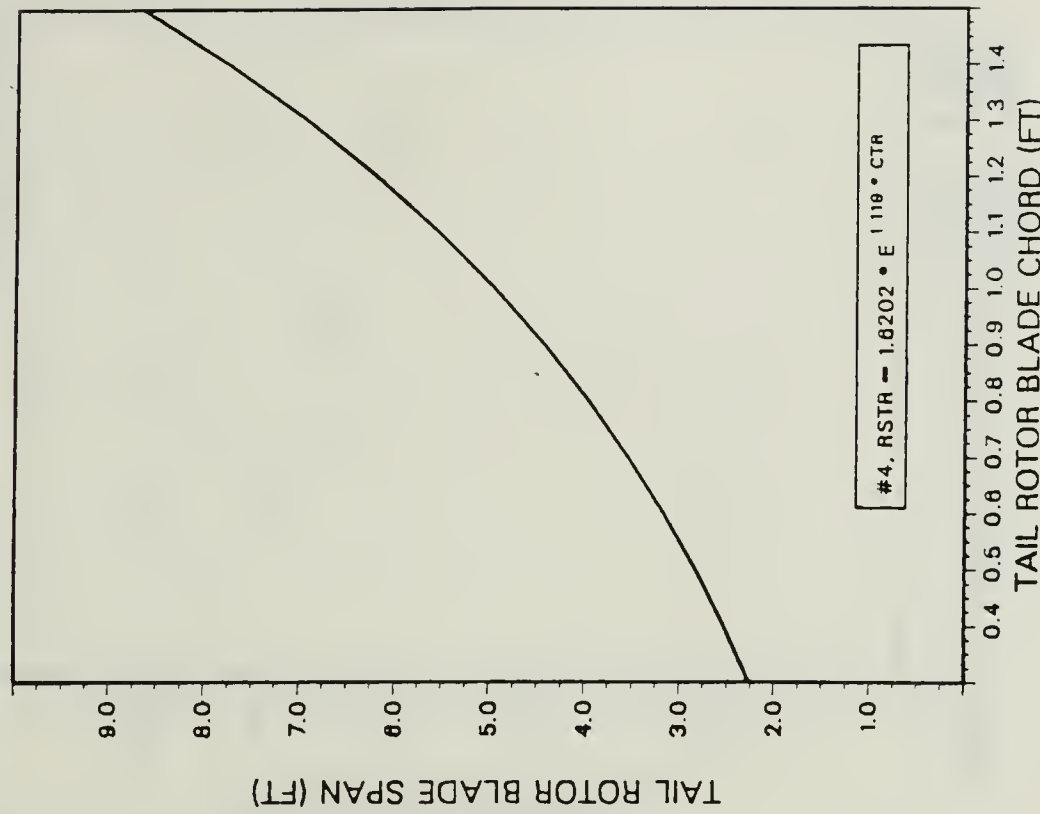


Fig. 9-11b.

Fig. 9-11a and 9-11b.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

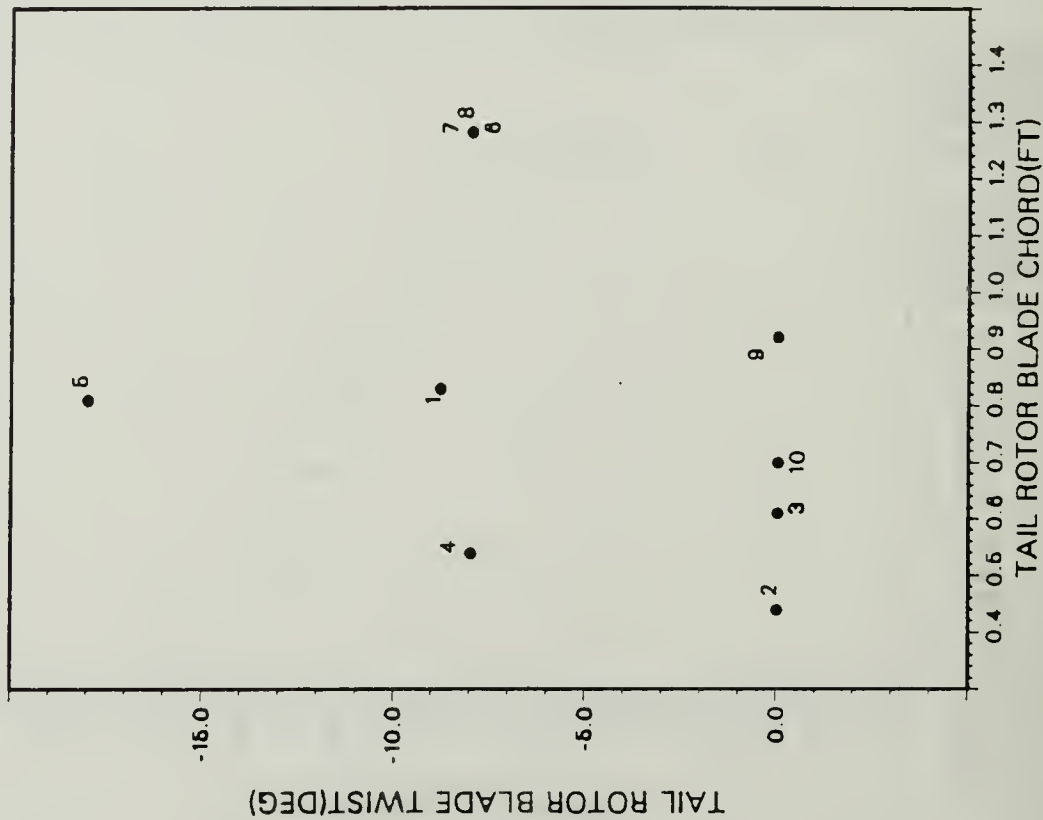


Fig. 9-13.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-64B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

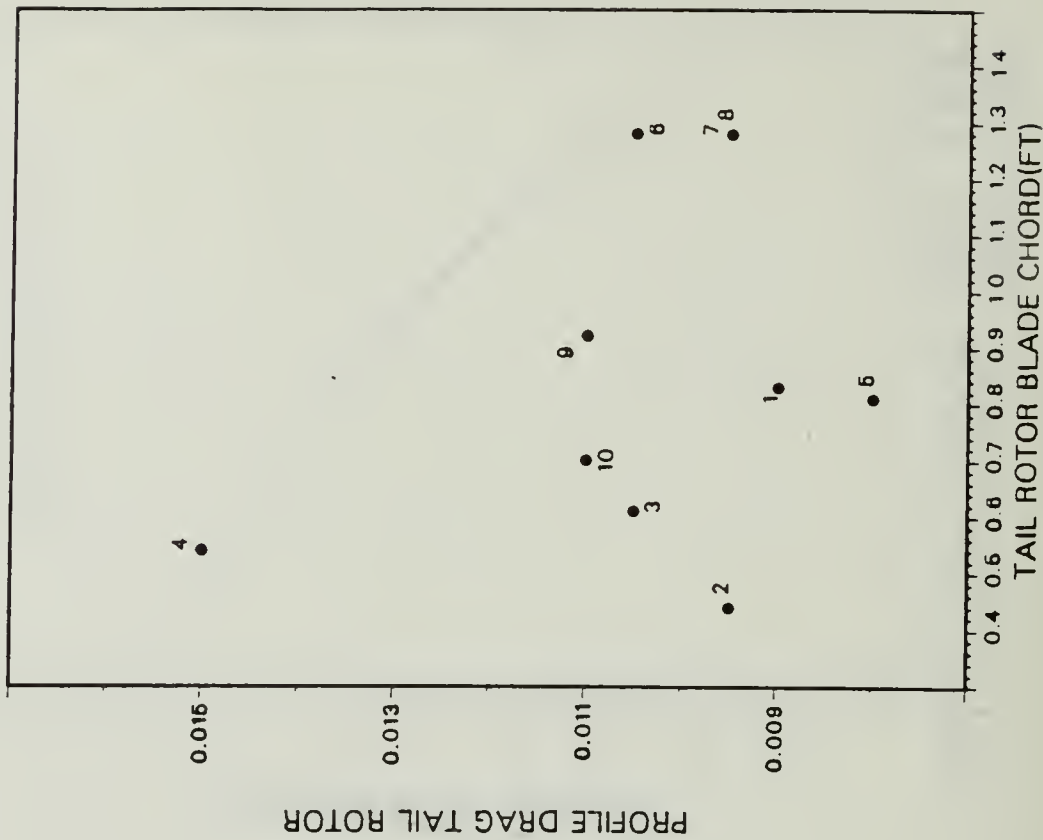


Fig. 9-15.

Fig. 9-13 and 9-15.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

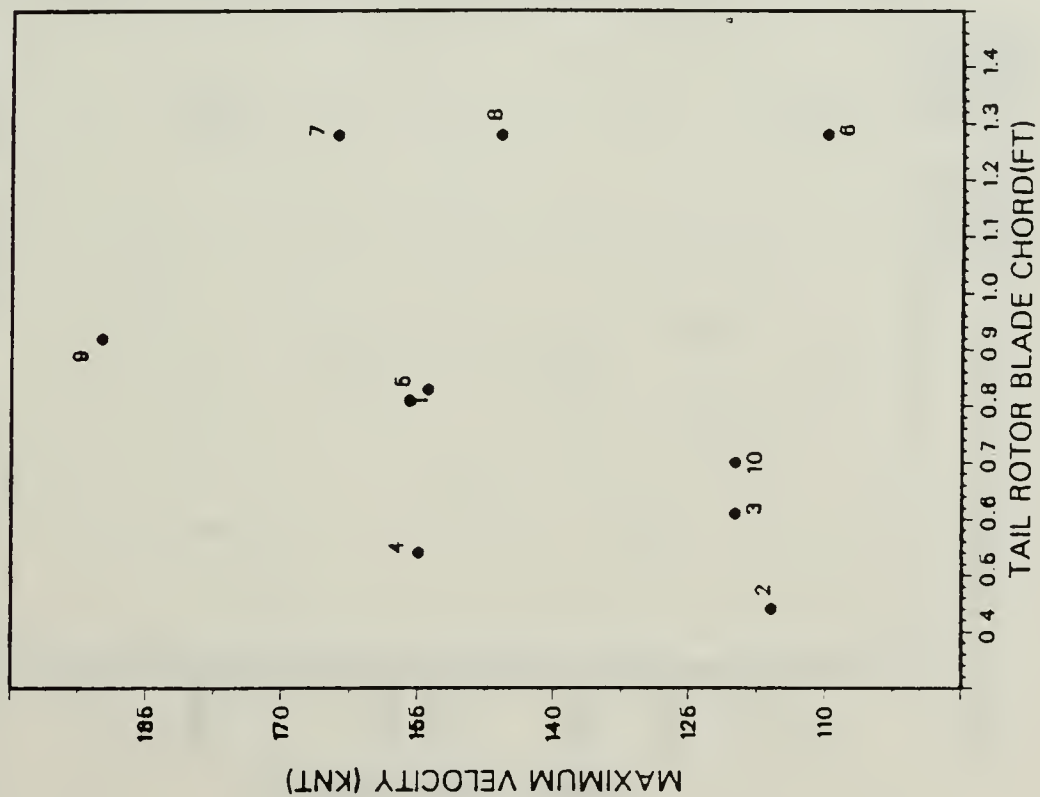


Fig. 9-21.

1. AH-84
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

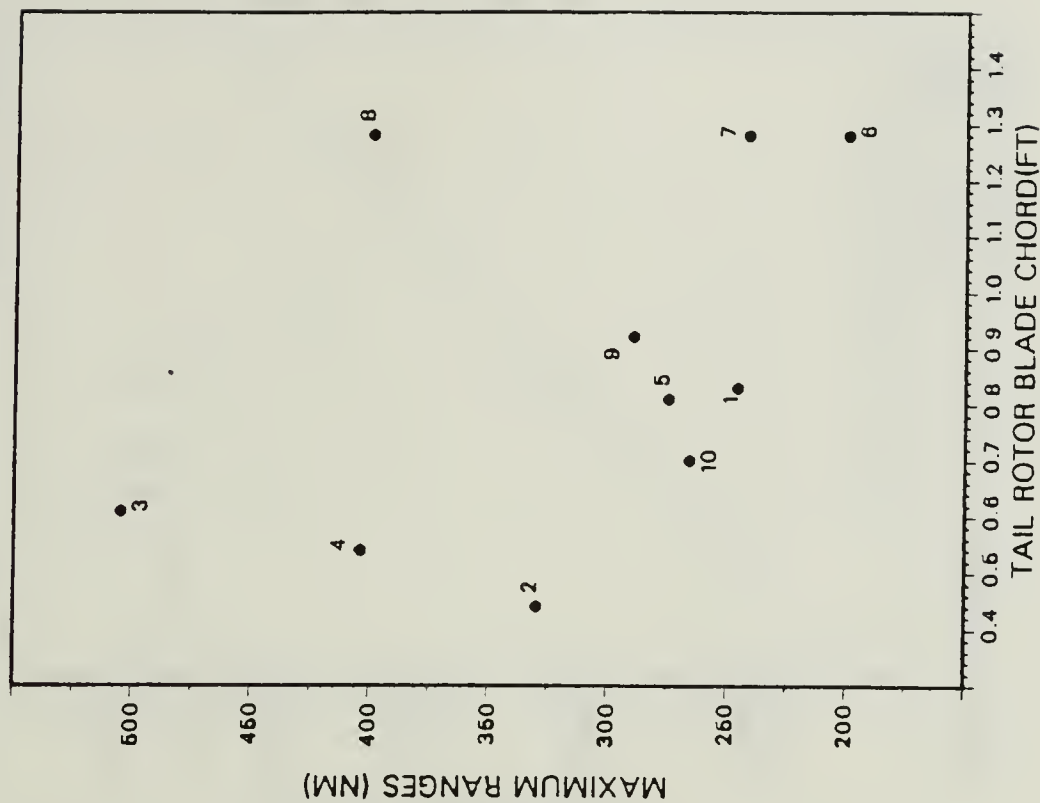


Fig. 9-22.

Fig. 9-21 and 9-22.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

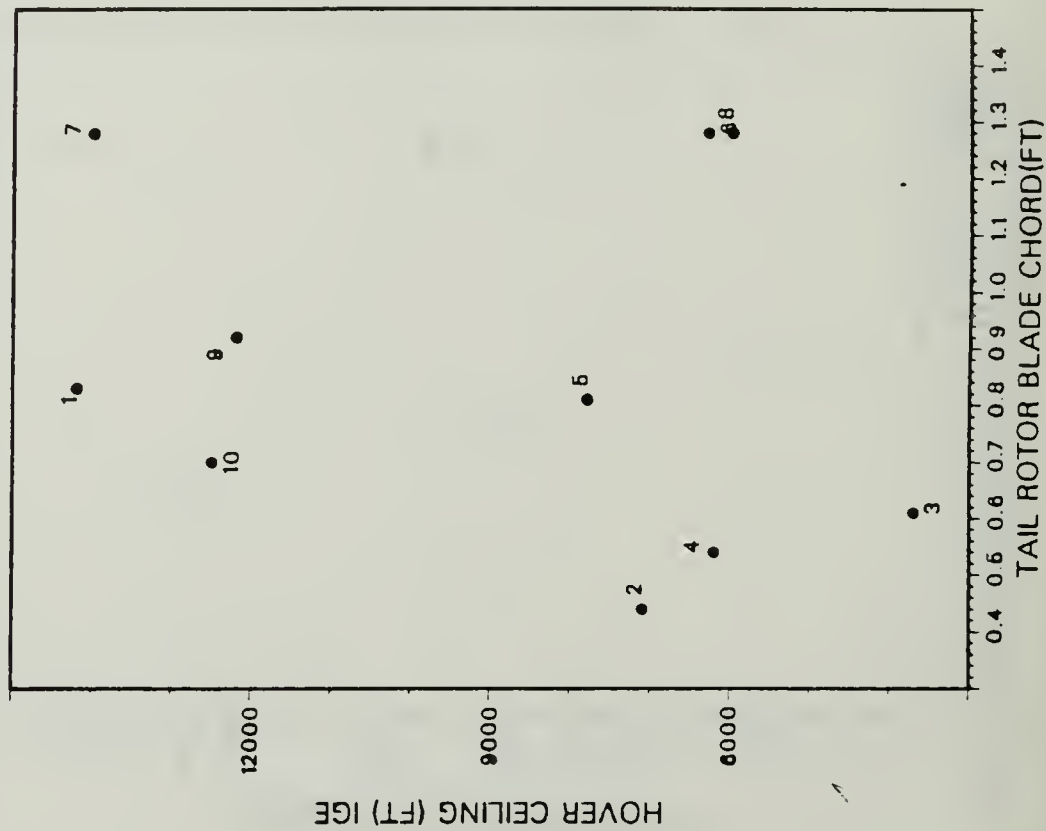


Fig. 9-24.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

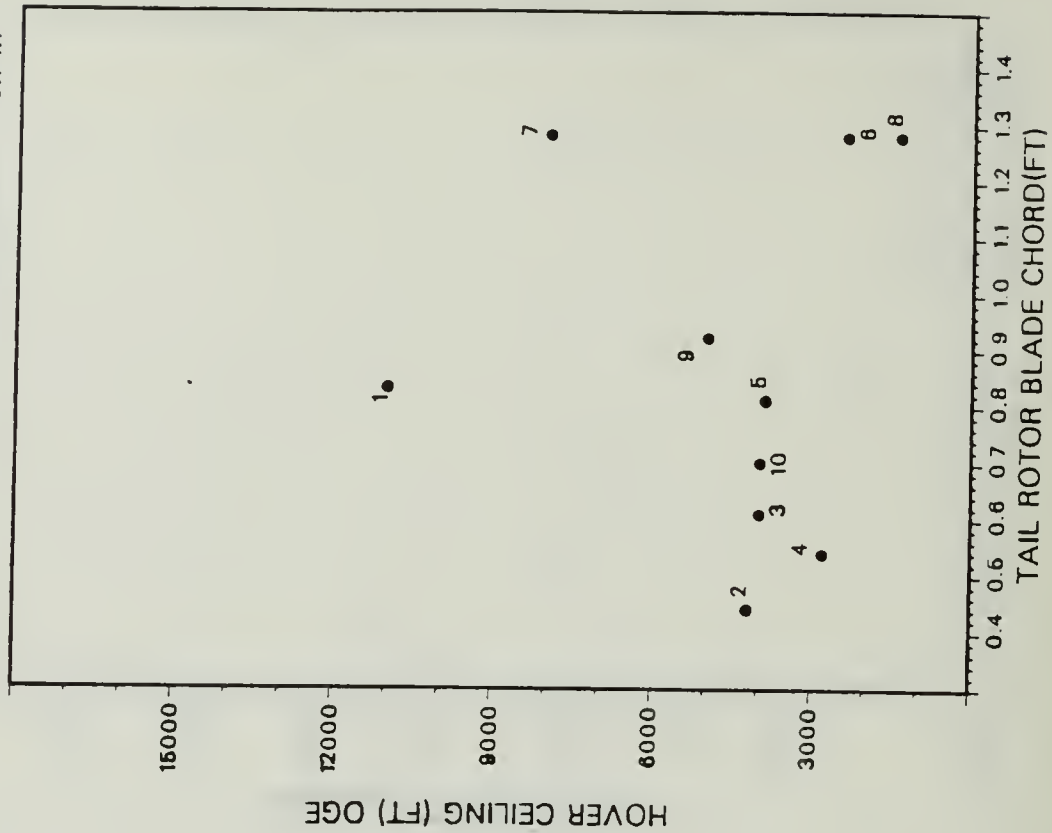


Fig. 9-25.

Fig. 9-24 and 9-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
6. UH-60A
8. CH-64B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

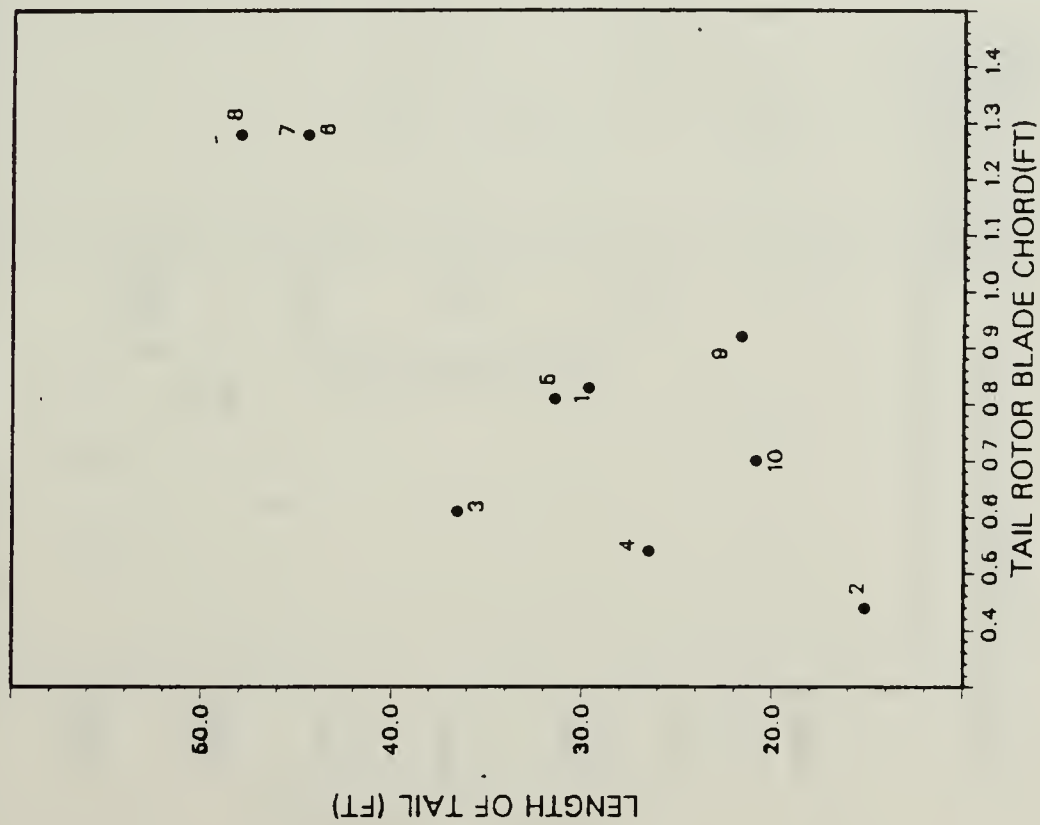


Fig. 9-26a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
6. UH-60A
8. CH-64B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

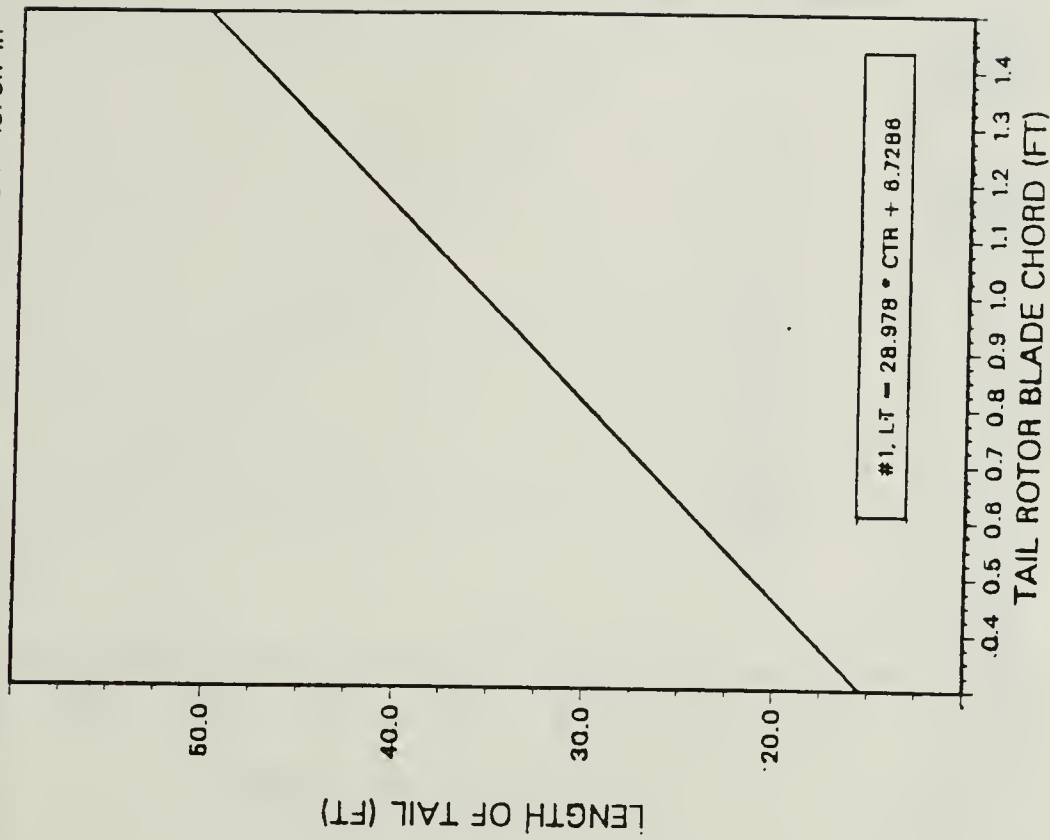


Fig. 9-26b.

Fig. 9-26a and 9-26b.

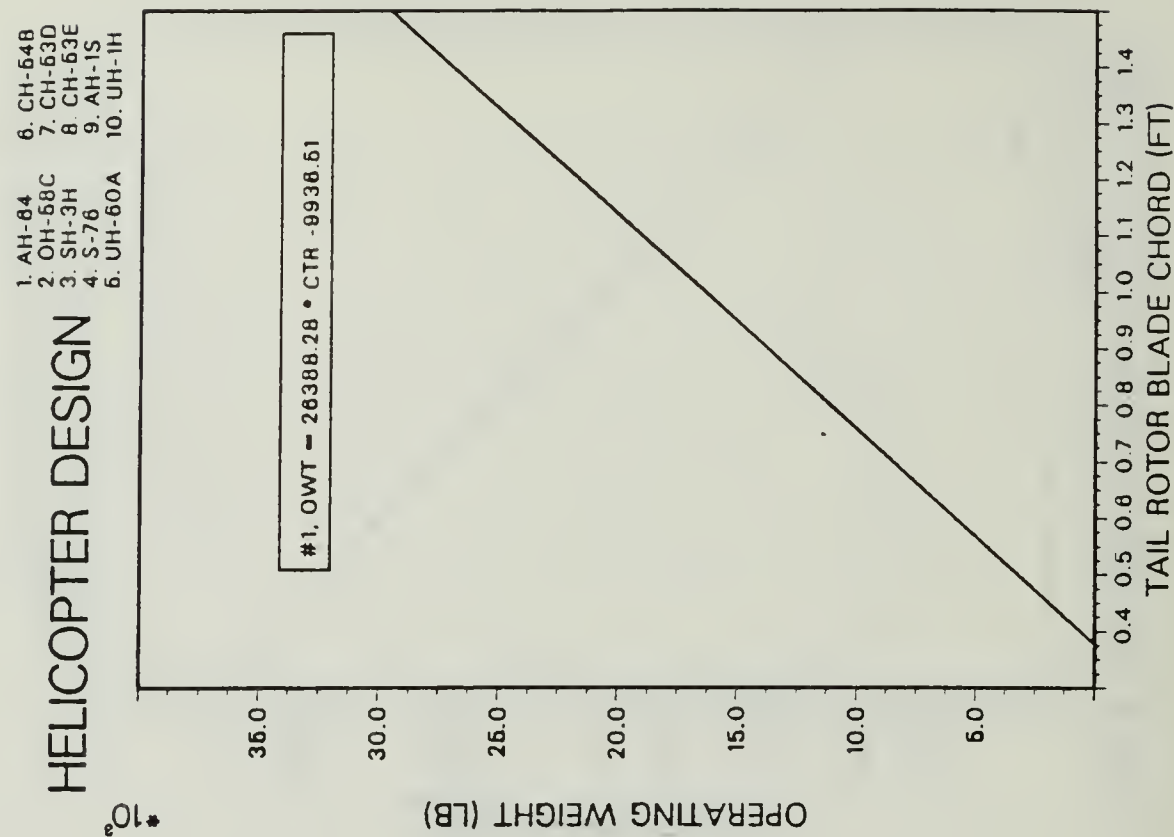


Fig. 9-27b.

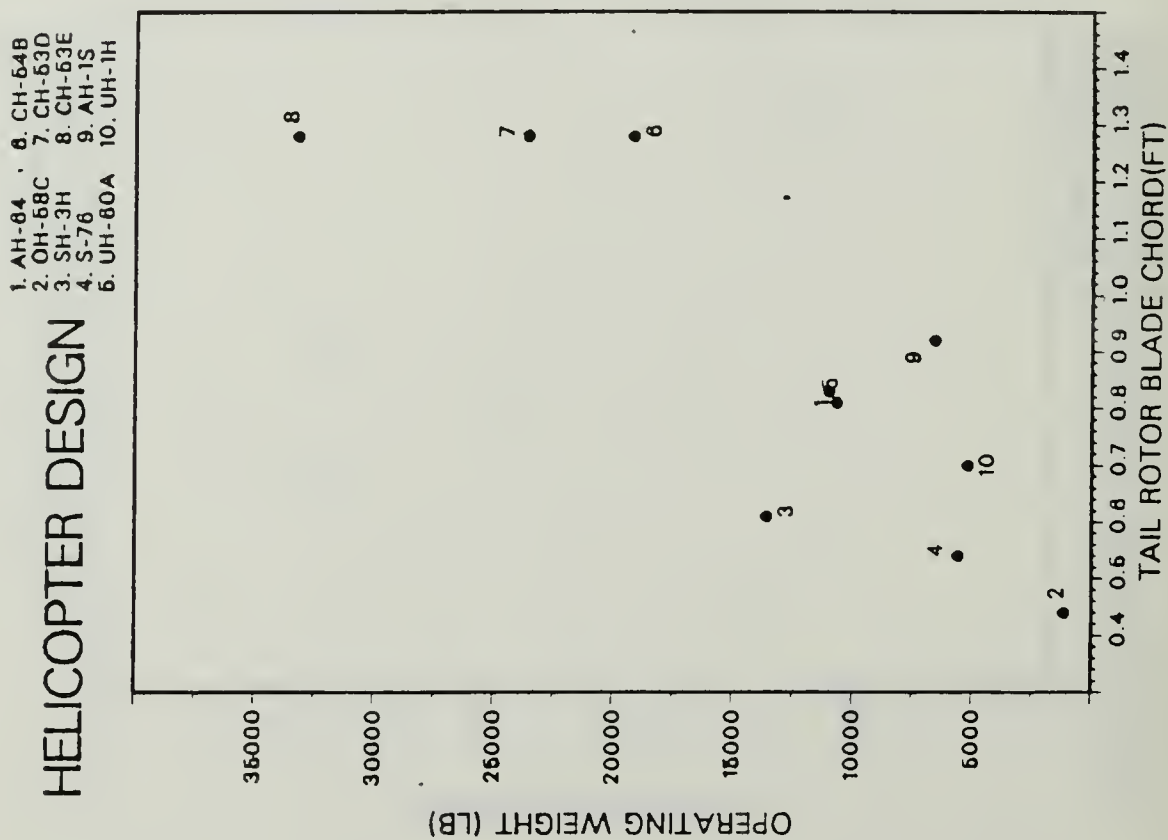


Fig. 9-27a.

Fig. 9-27a and 9-27b.

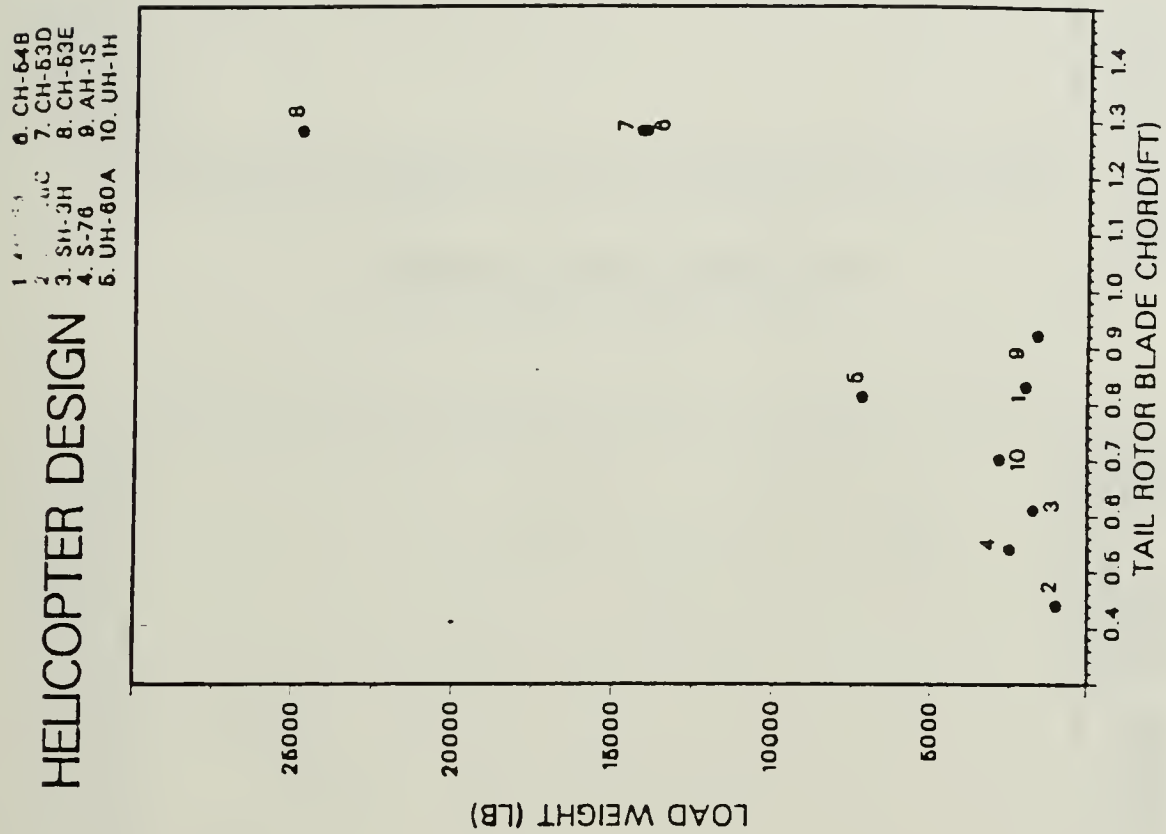


Fig. 9-28.

Fig. 9-28.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

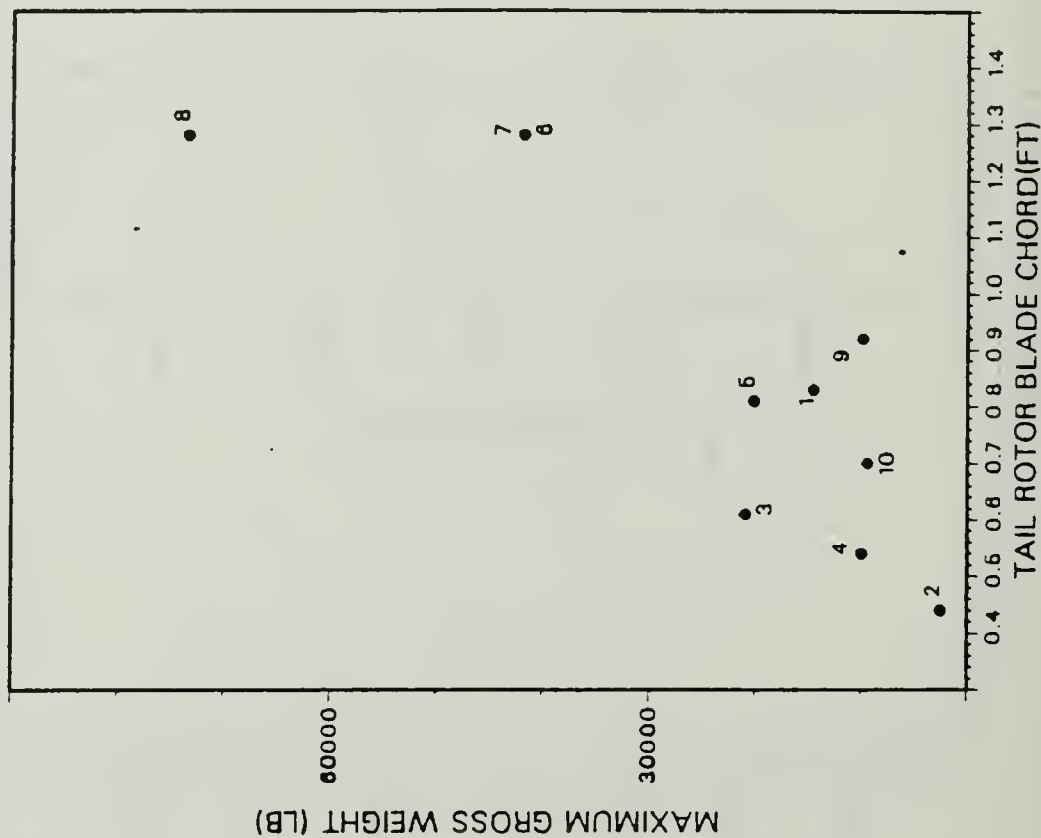


Fig. 9-30a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

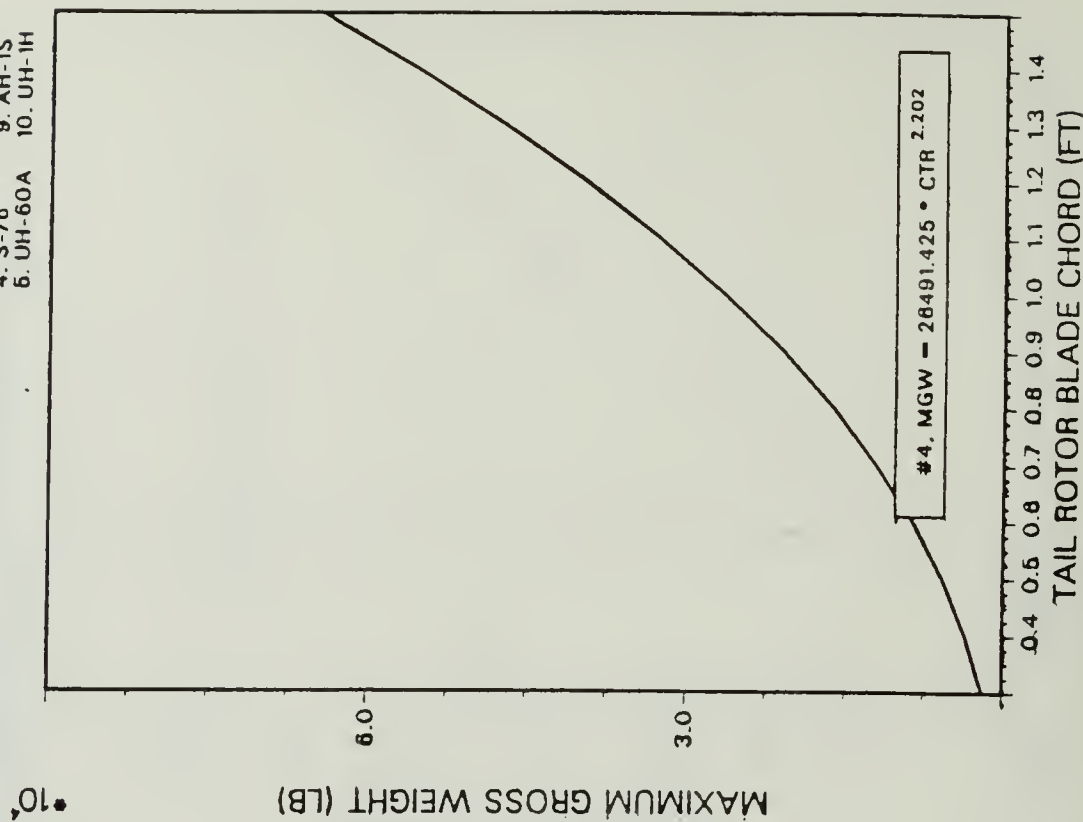


Fig. 9-30b.

Fig. 9-30a and 9-30b.

Span of Main Rotor Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

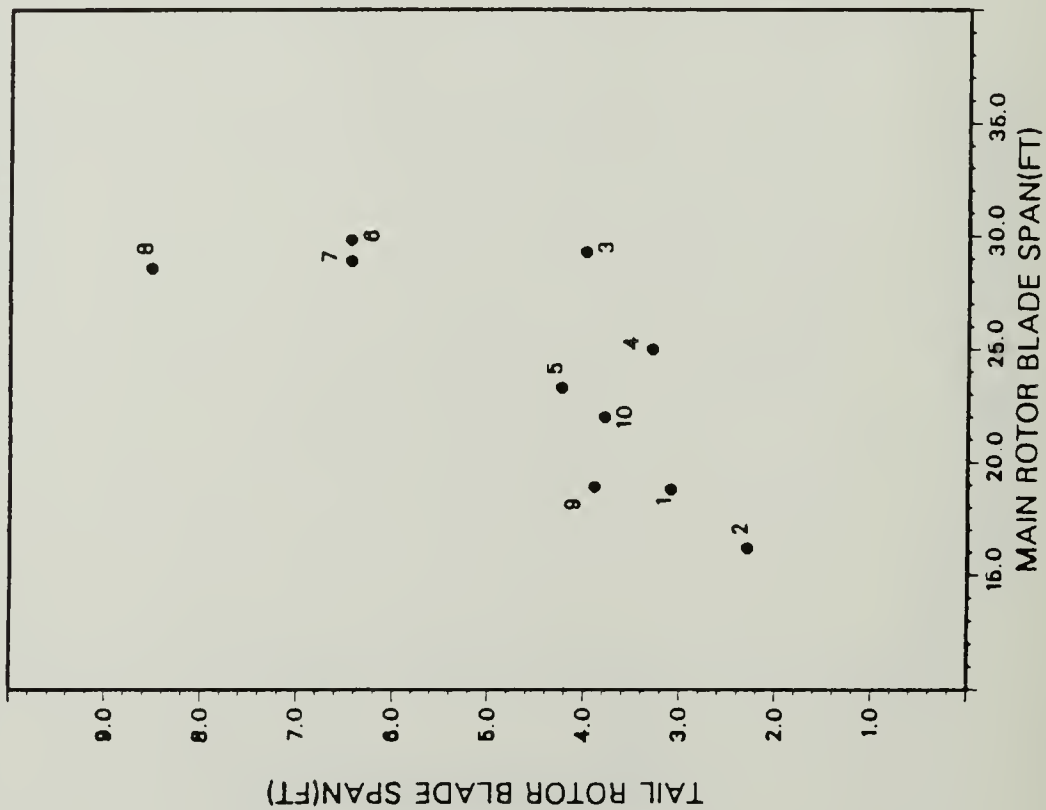


Fig. 10-11.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

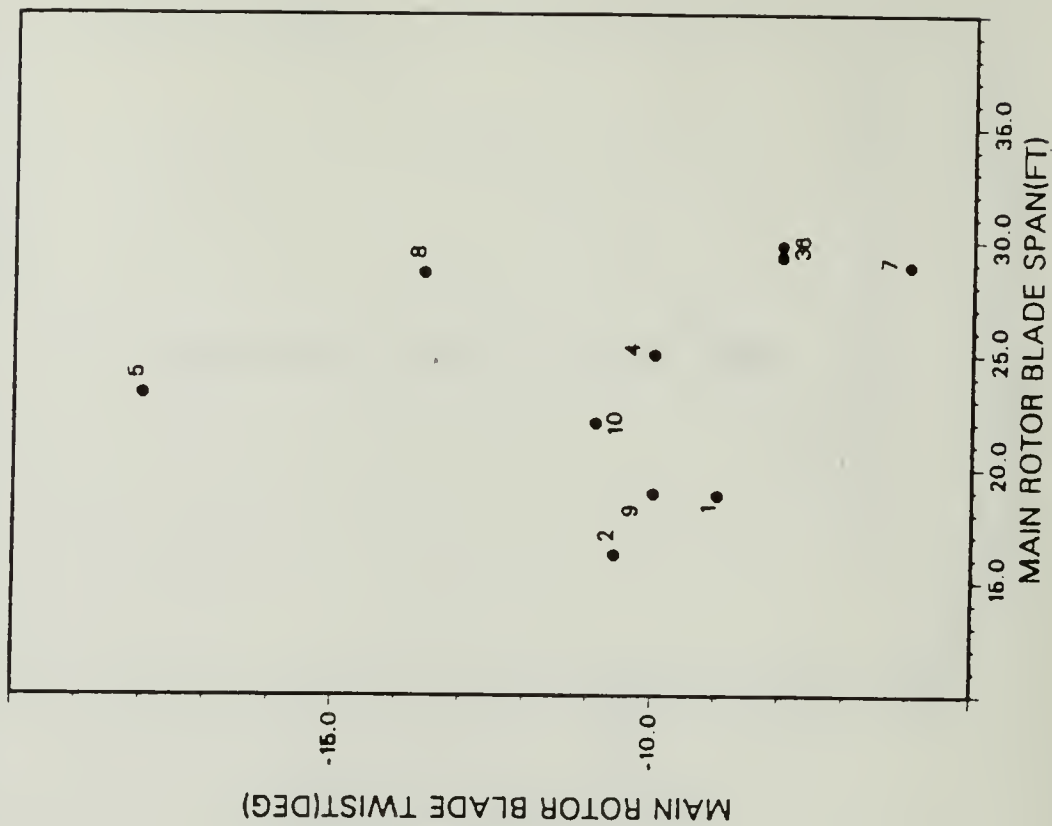


Fig. 10-12.

Fig. 10-11 and 10-12.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

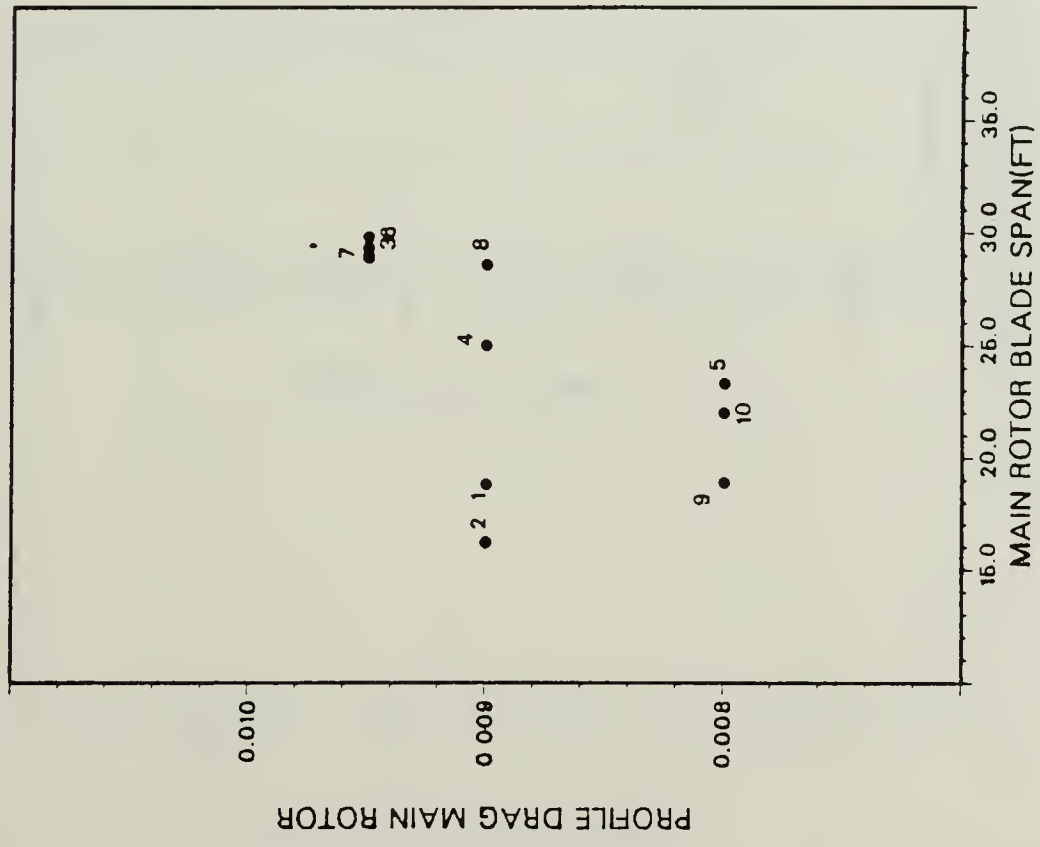


Fig. 10-14.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

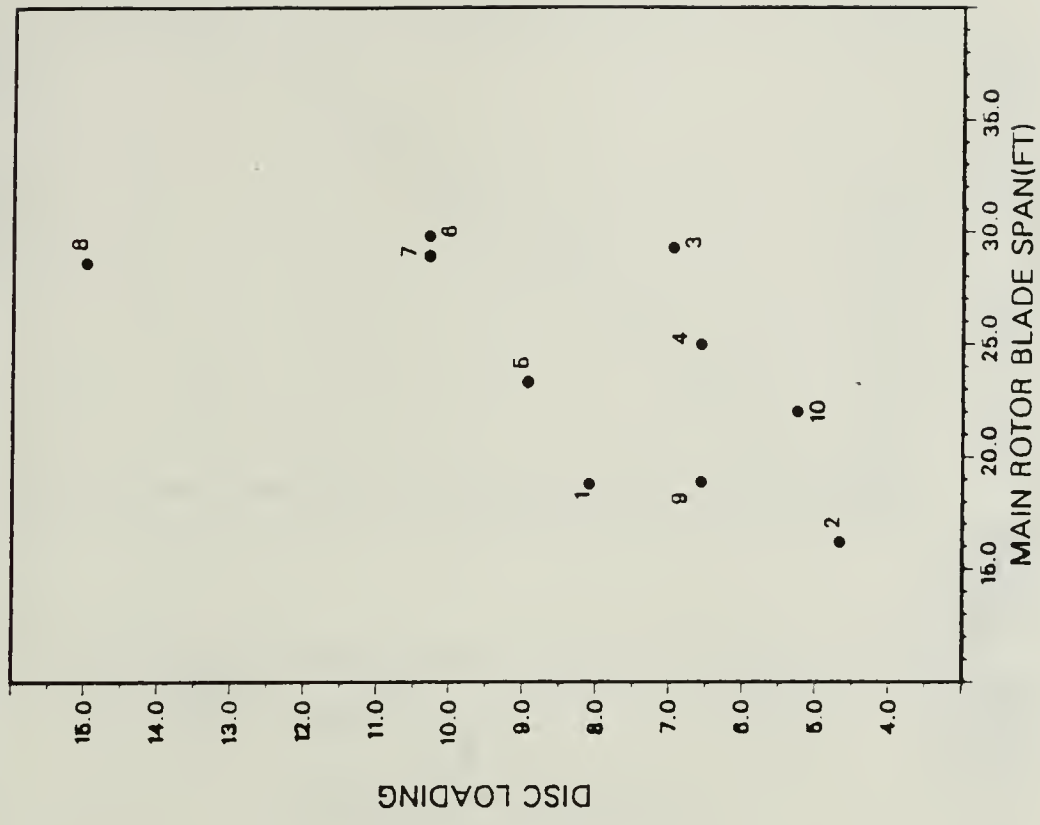


Fig. 10-16.

Fig. 10-14 and 10-16.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

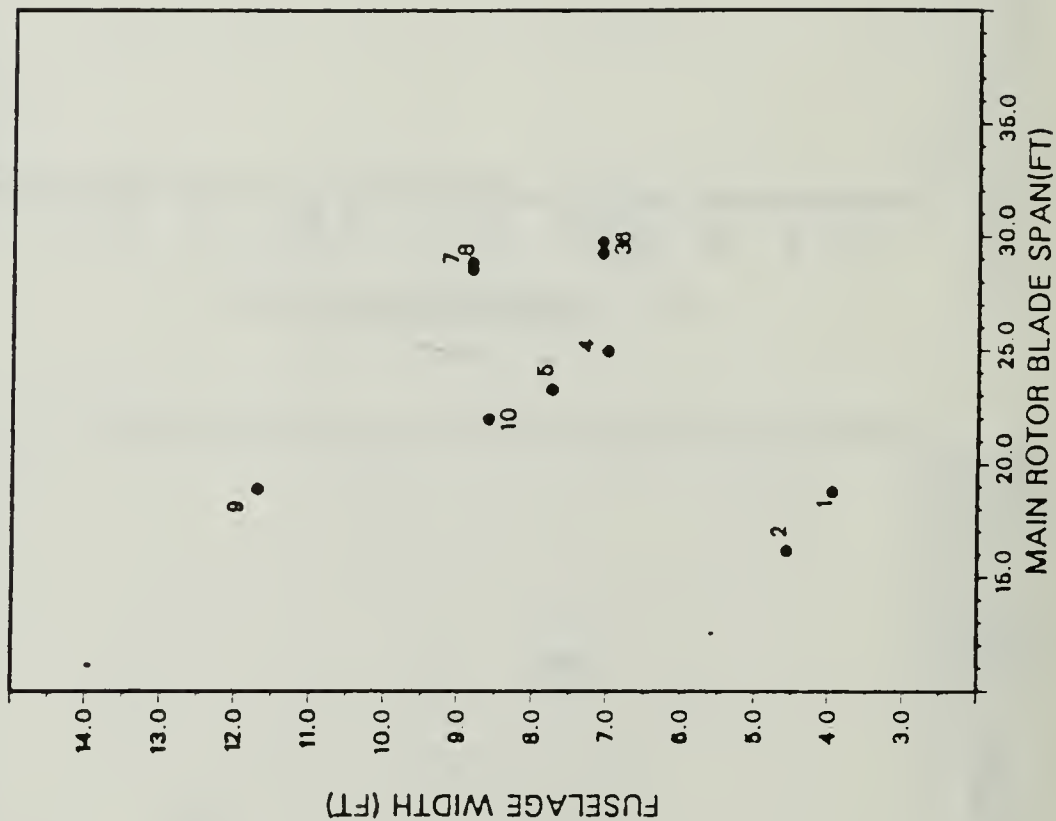


Fig. 10-17.

Fig. 10-17.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

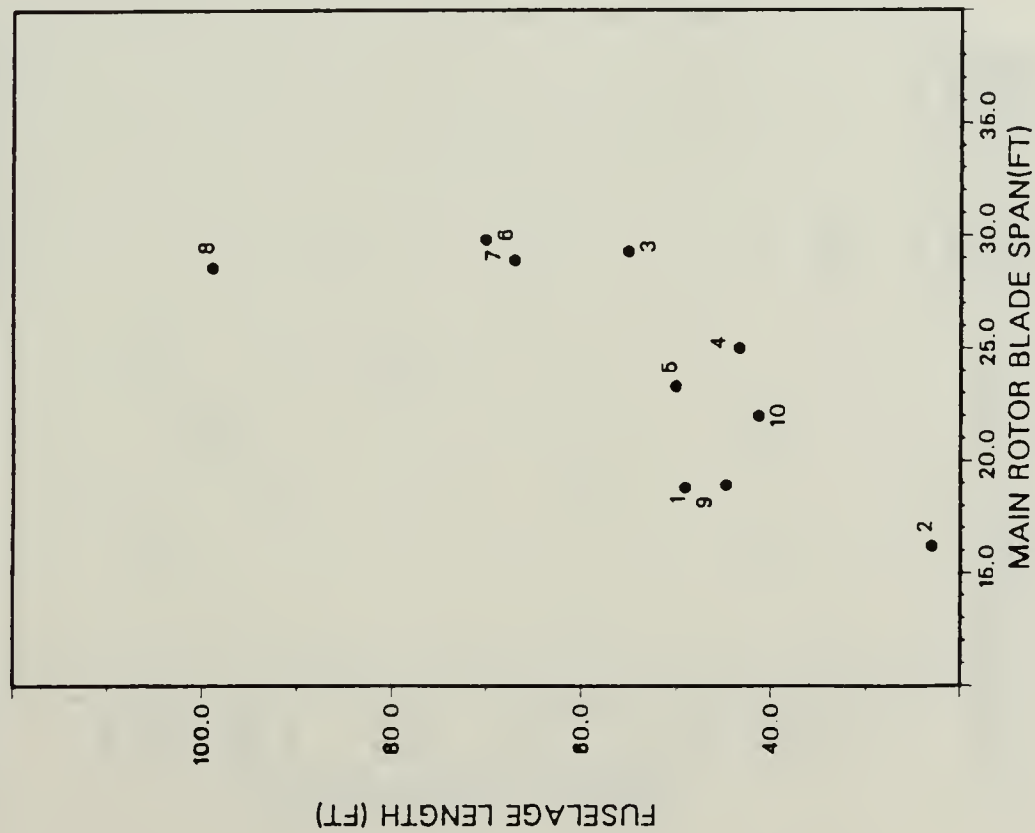


Fig. 10-18a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

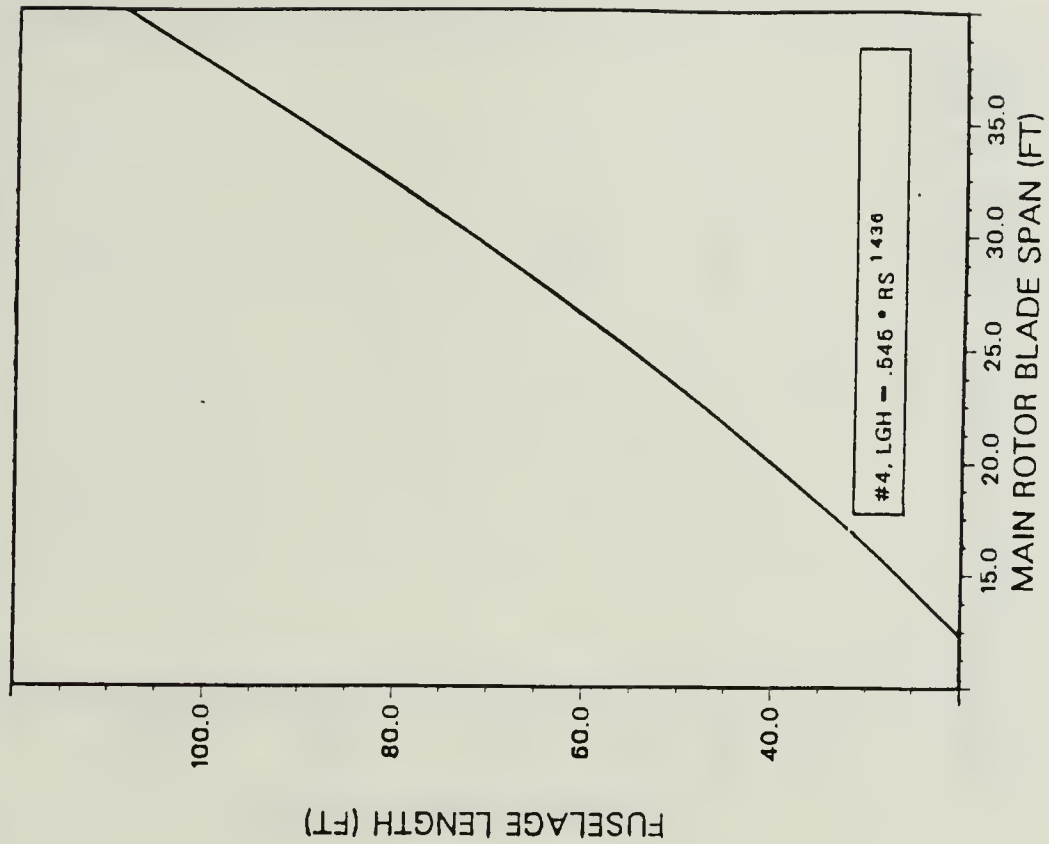


Fig. 10-18b.

Fig. 10-18a and 10-18b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

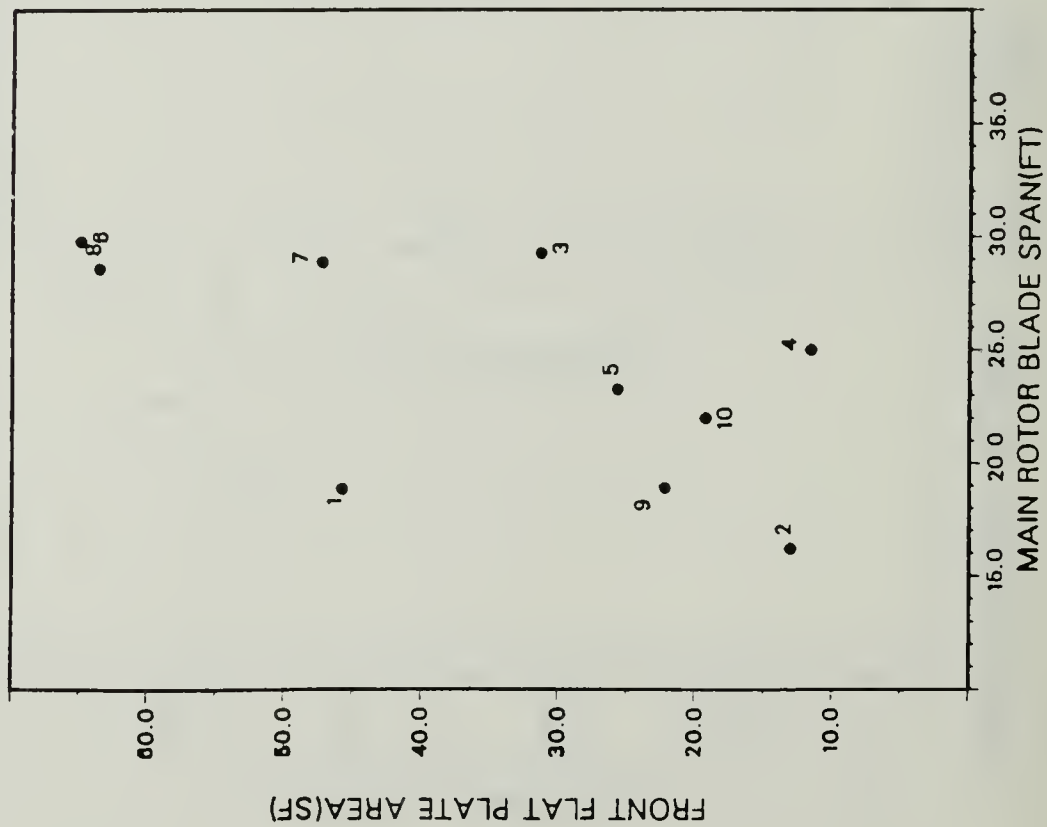


Fig. 10-19.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

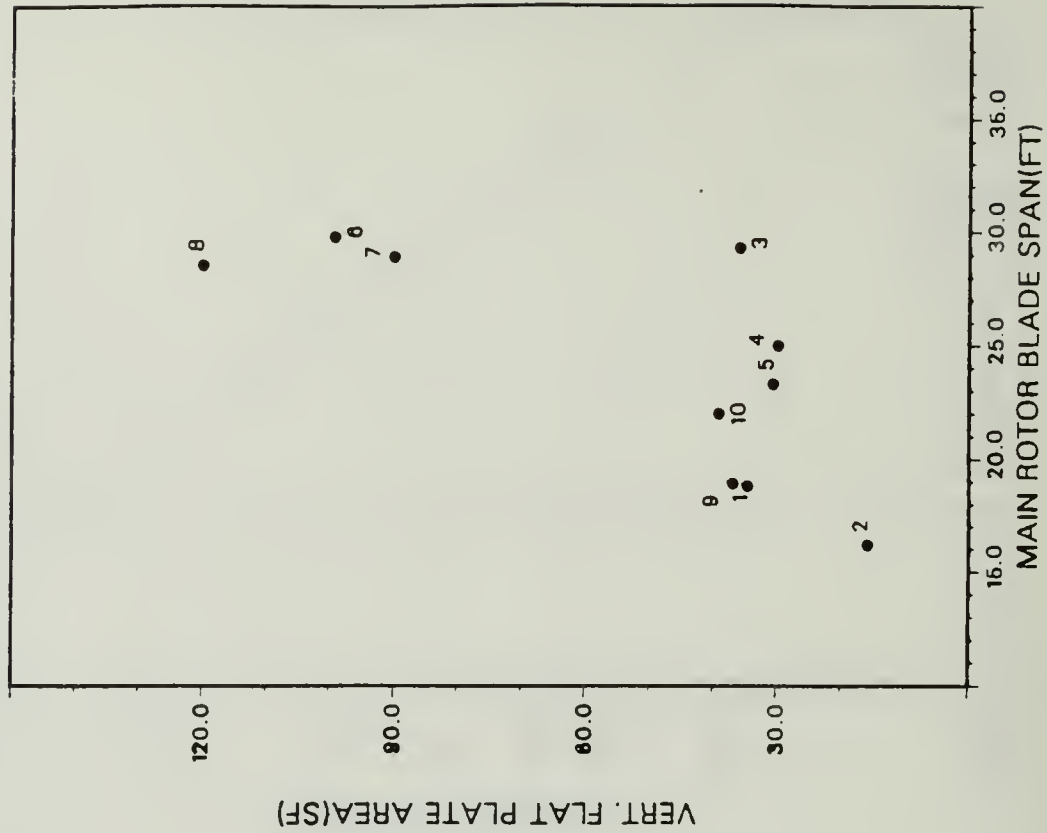


Fig. 10-20.

Fig. 10-19 and 10-20.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

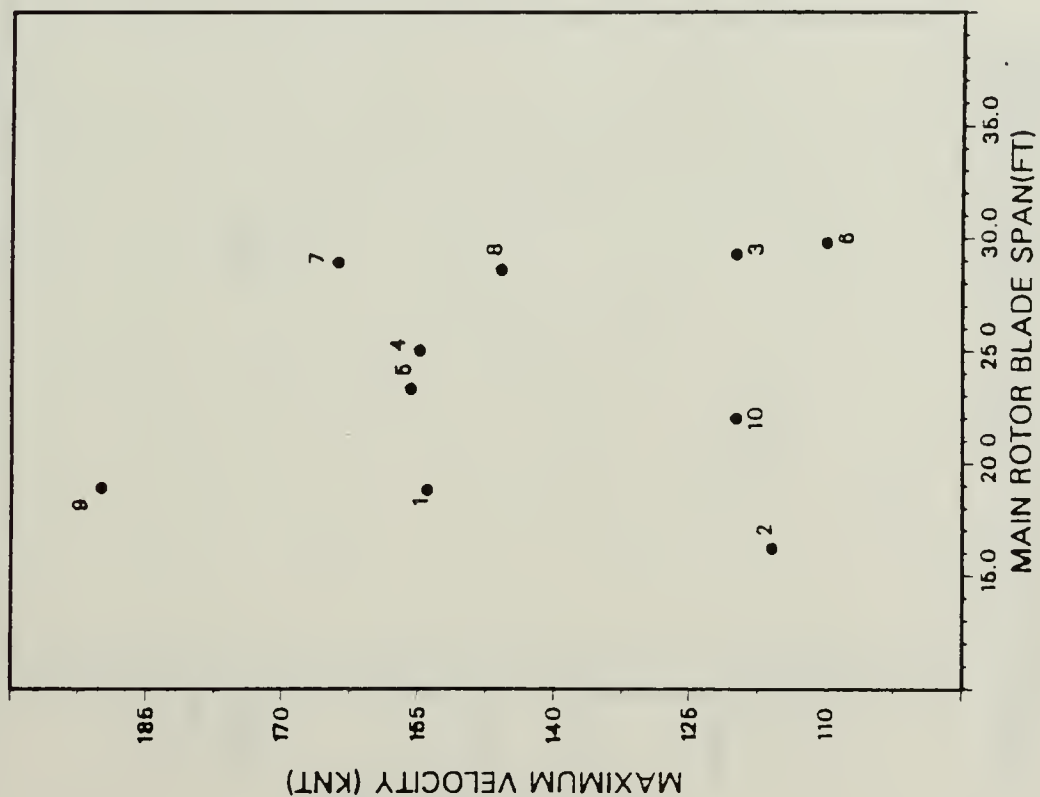


Fig. 10-21.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

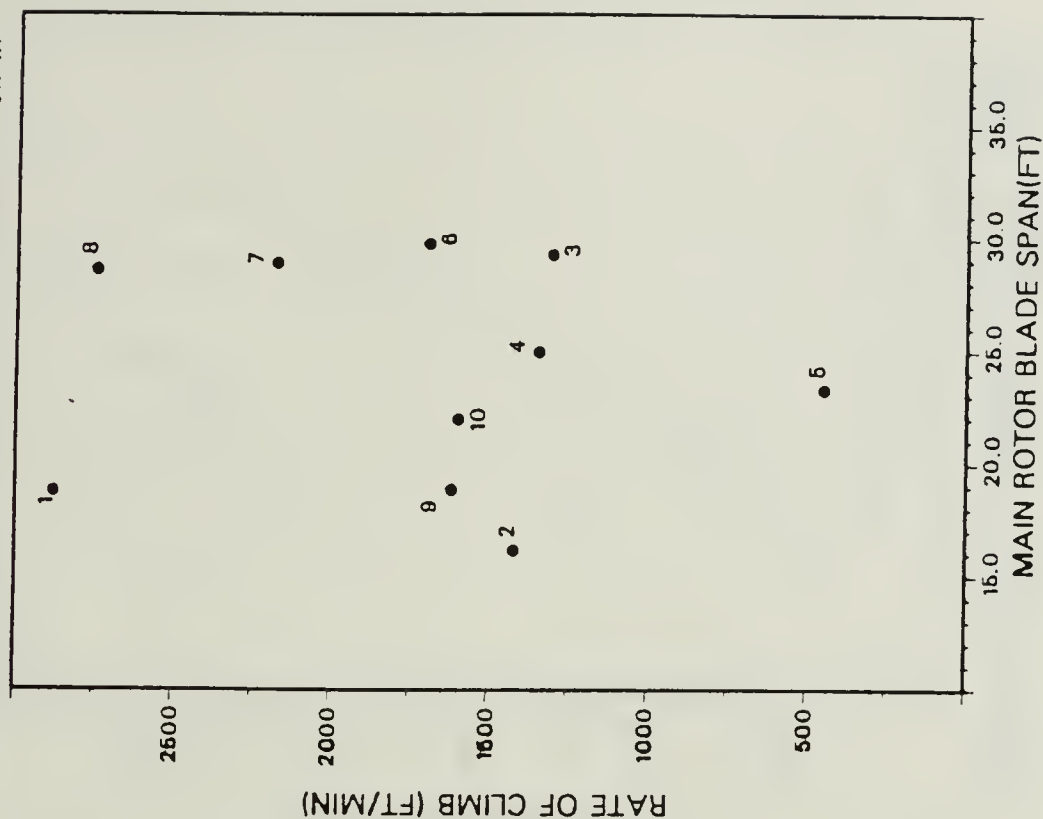


Fig. 10-23.

Fig. 10-21 and 10-23.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

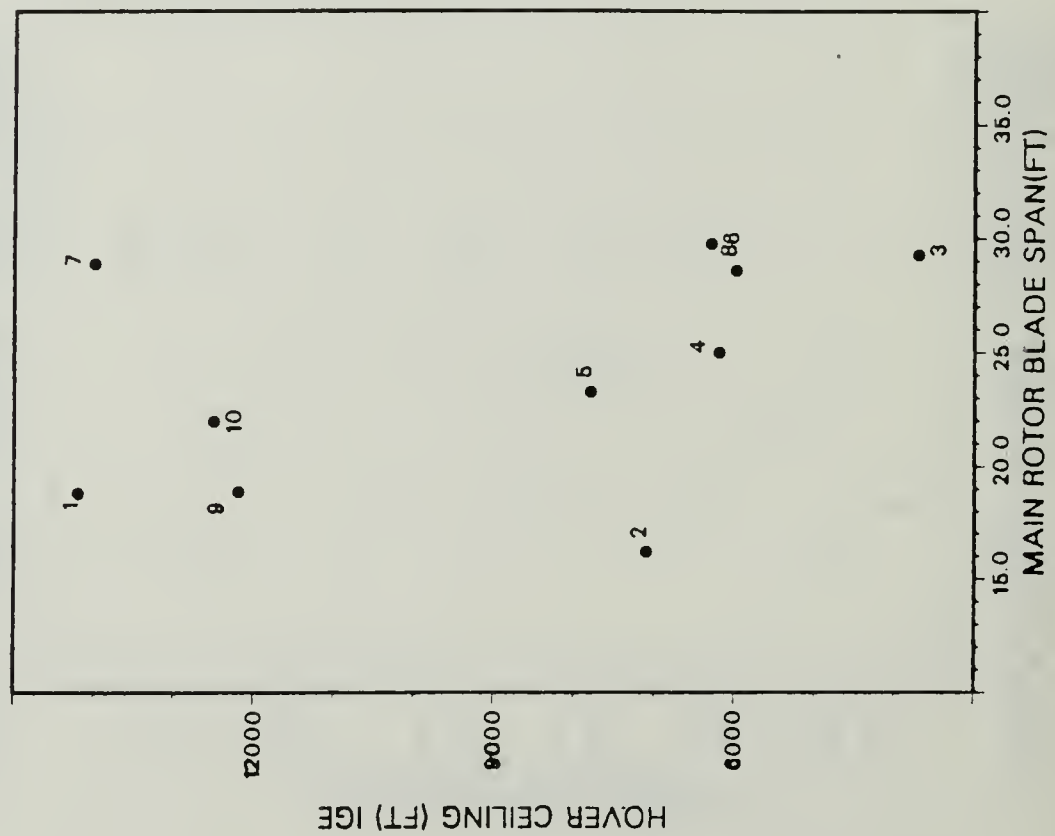


Fig. 10-24.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

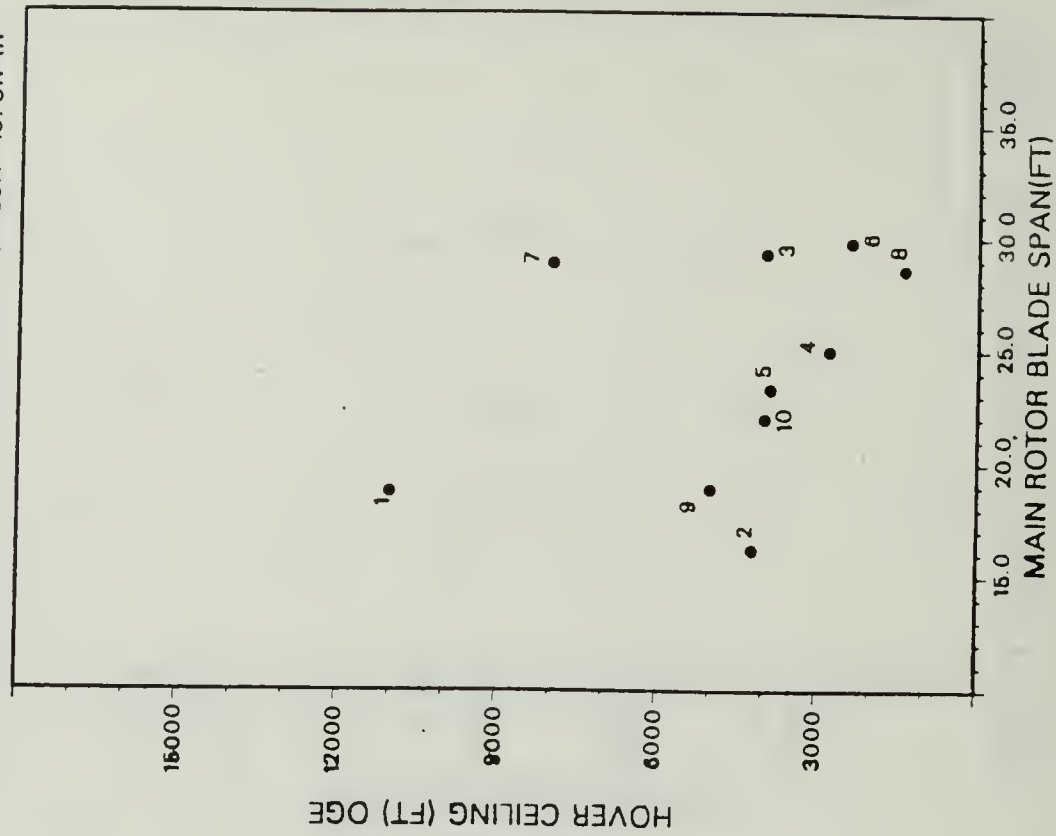


Fig. 10-25.

Fig. 10-24 and 10-25.

HELICOPTER DESIGN

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

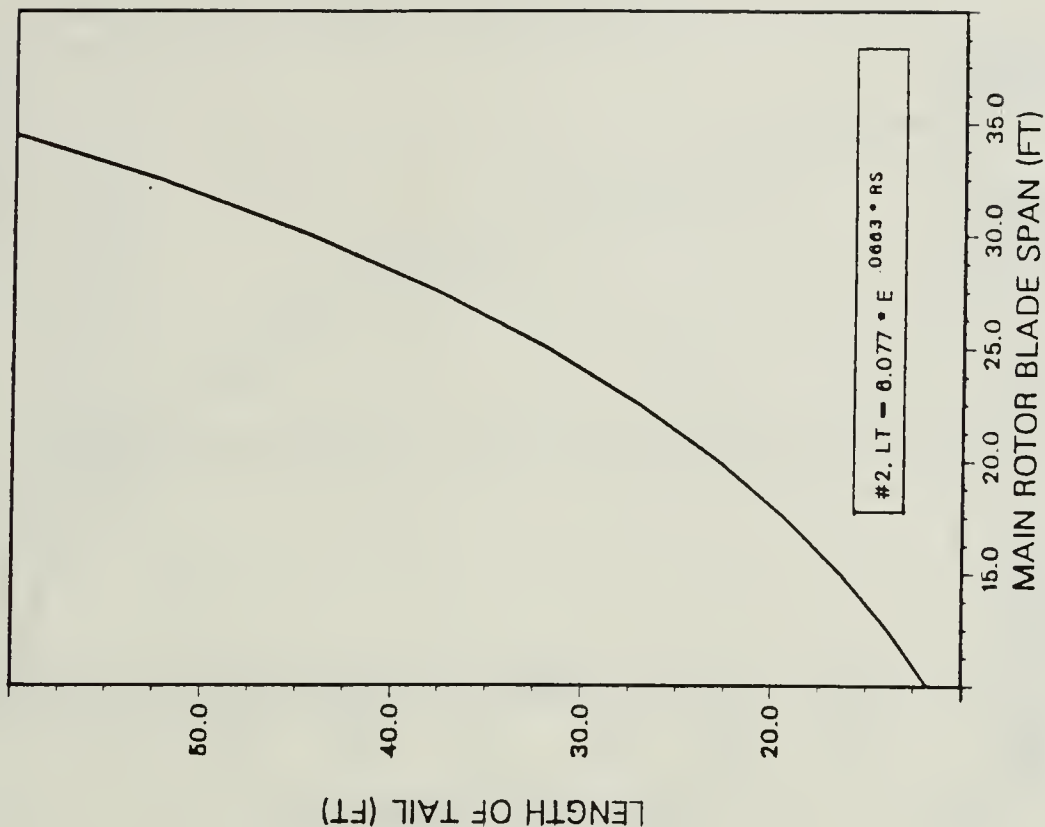


Fig. 10-26b.

HELICOPTER DESIGN

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

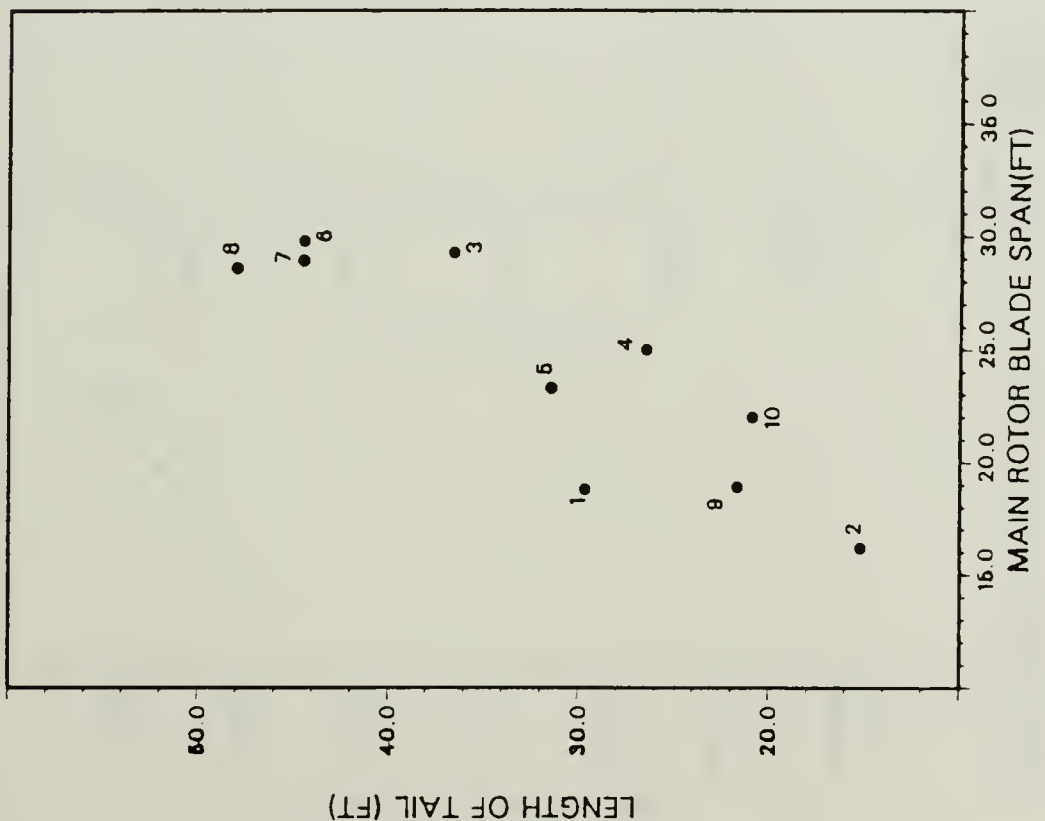


Fig. 10-26a.

Fig. 10-26a and 10-26b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

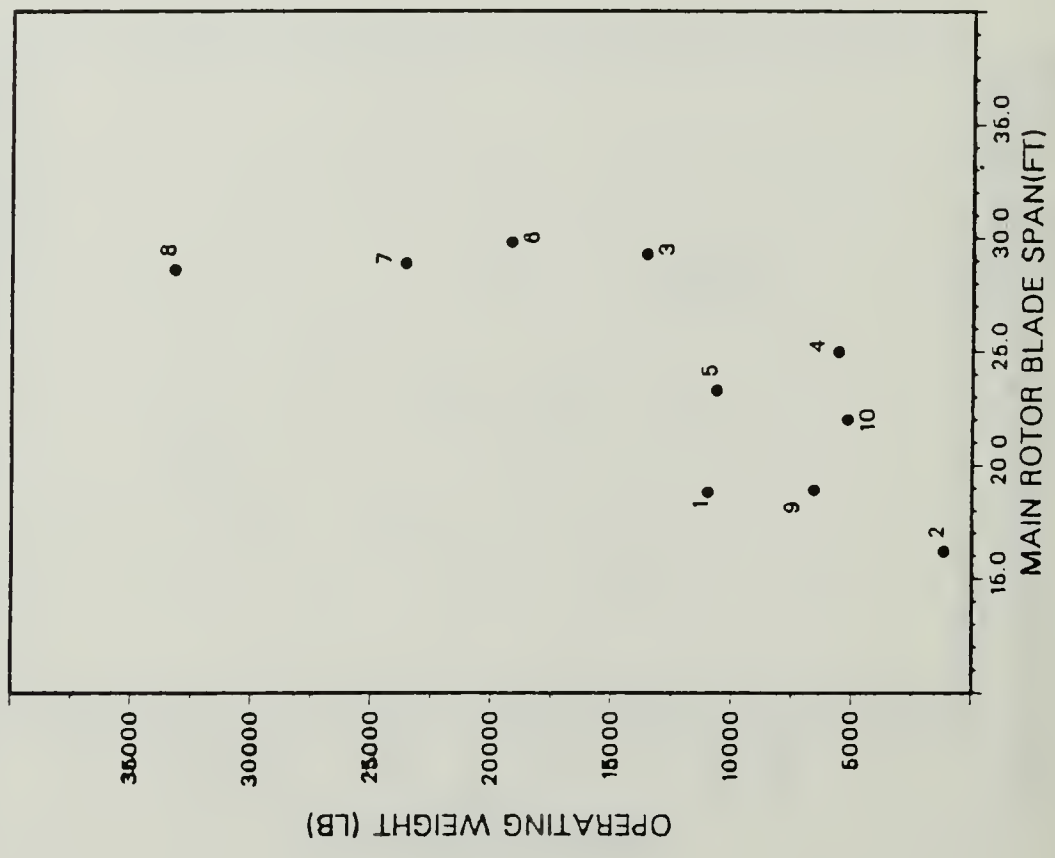


Fig. 10-27a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

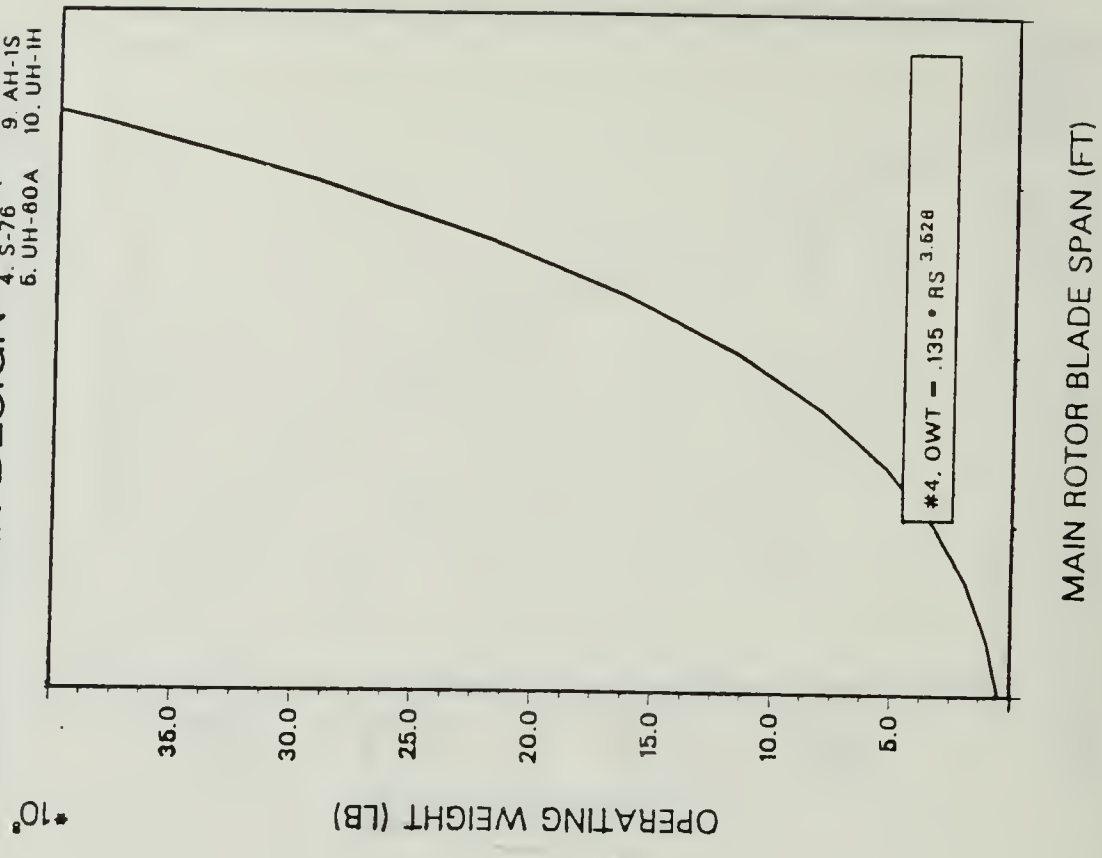


Fig. 10-27b.

Fig. 10-27a and 10-27b.

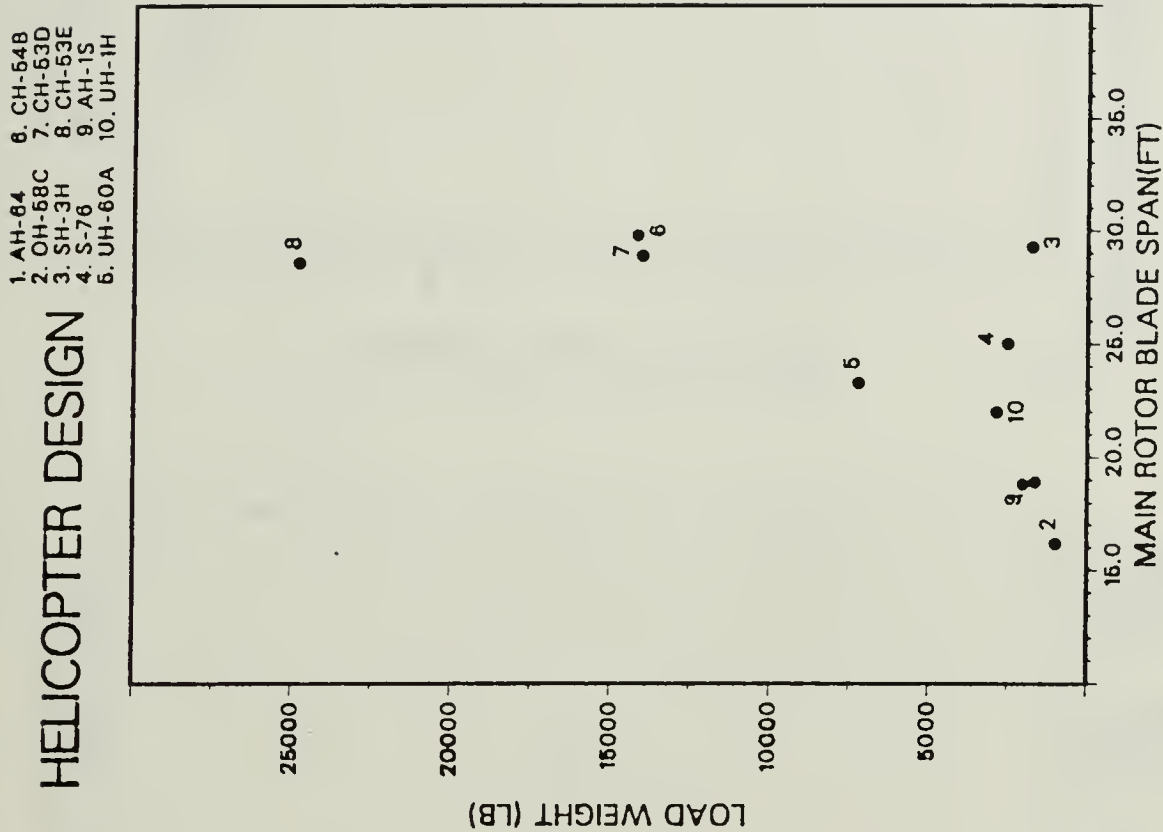


Fig. 10-28.

Fig. 10-28.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

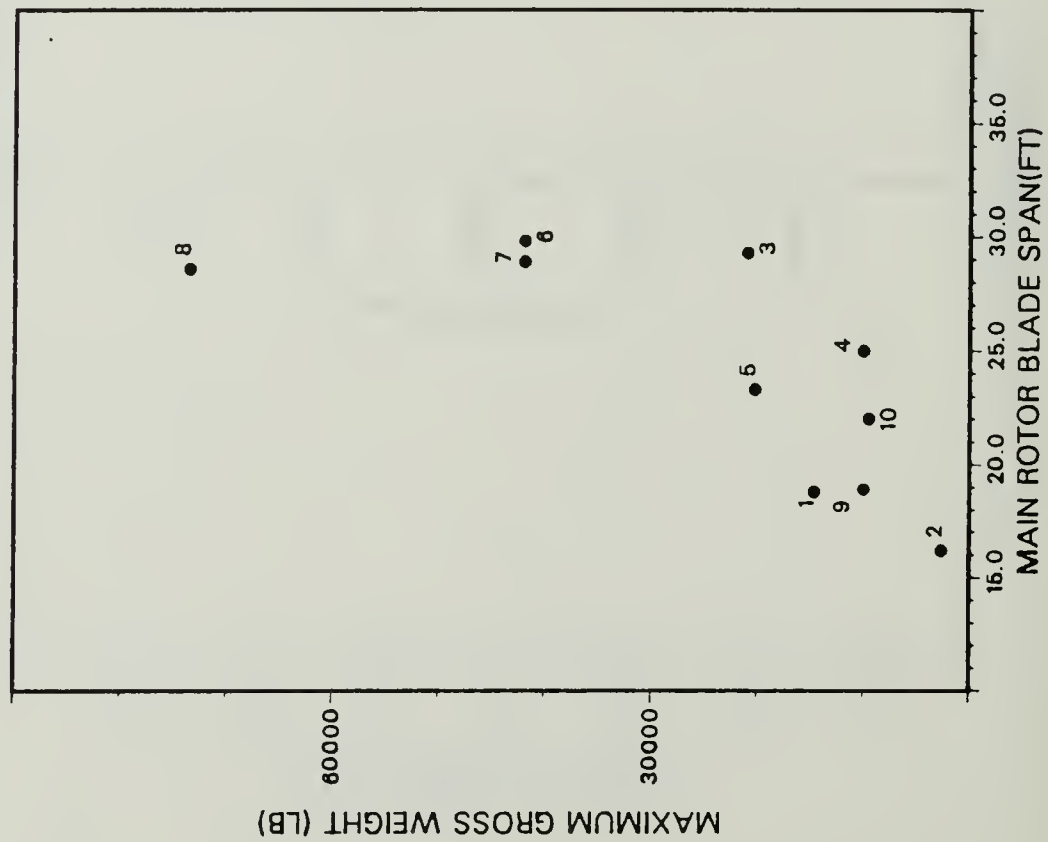


Fig. 10-30a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

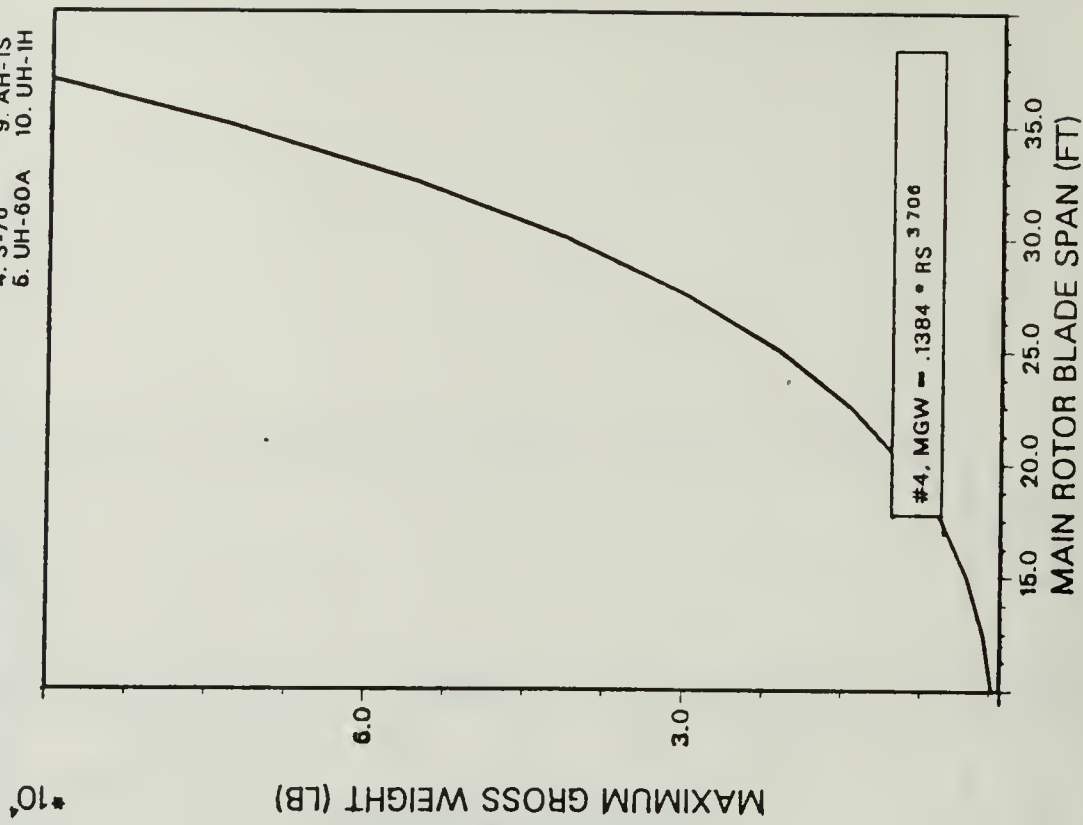


Fig. 10-30b.

Fig. 10-30a and 10-30b.

Span of Tail Rotor Pairings.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

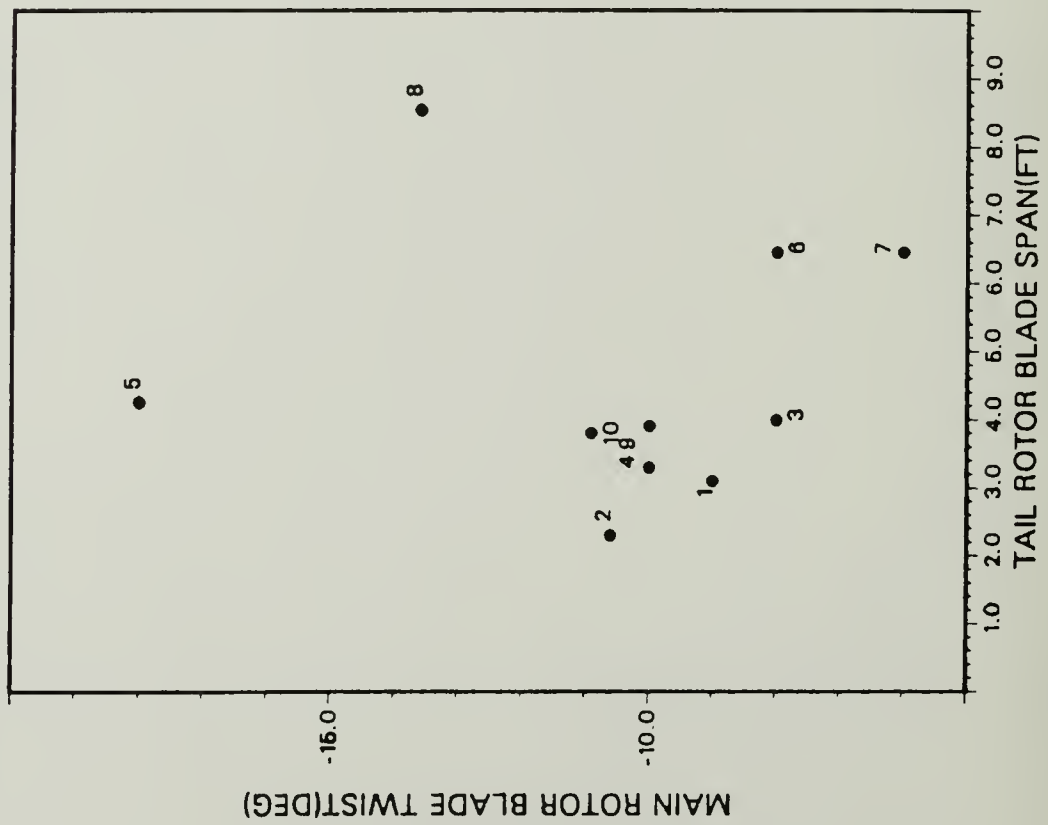


Fig. 11-12.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

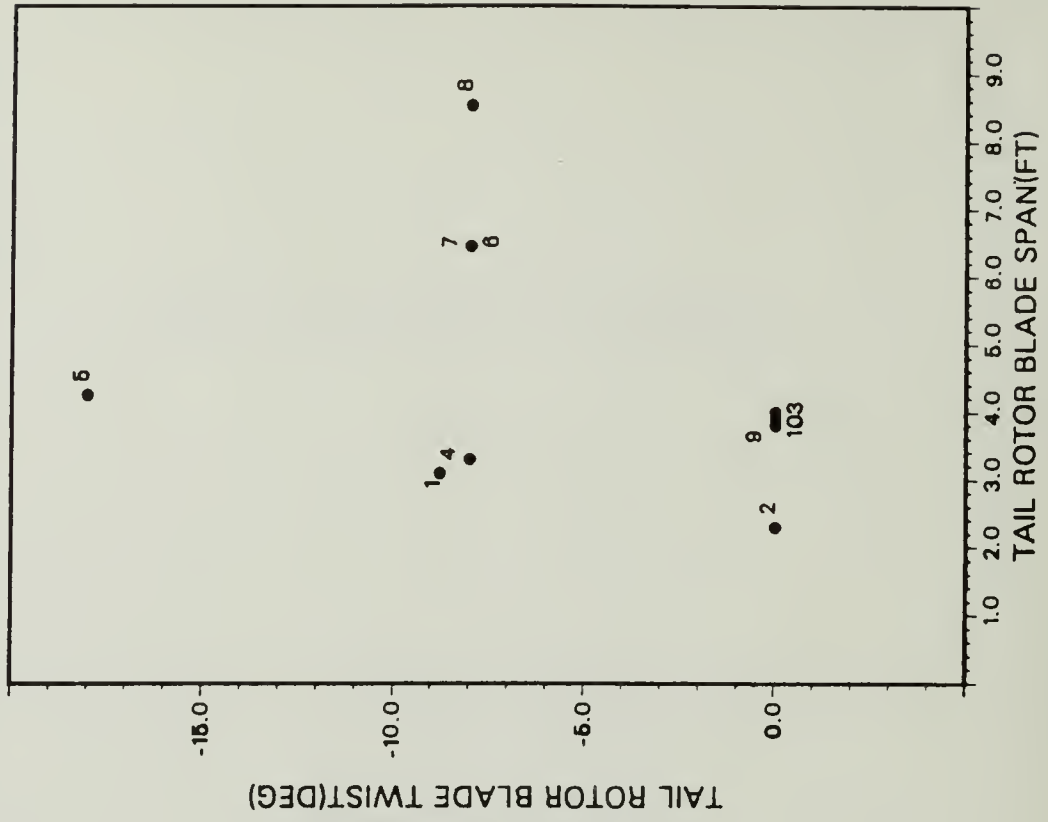


Fig. 11-13.

Fig. 11-12 and 11-13.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

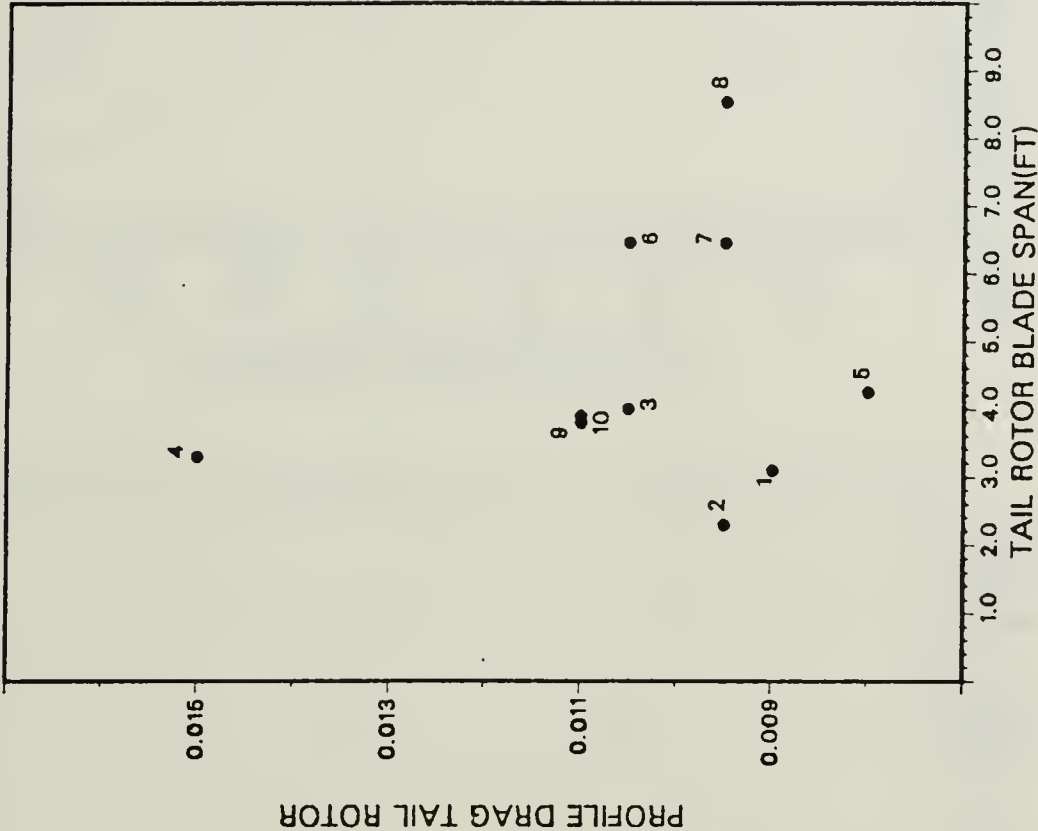


Fig. 11-15.

Fig. 11-15.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

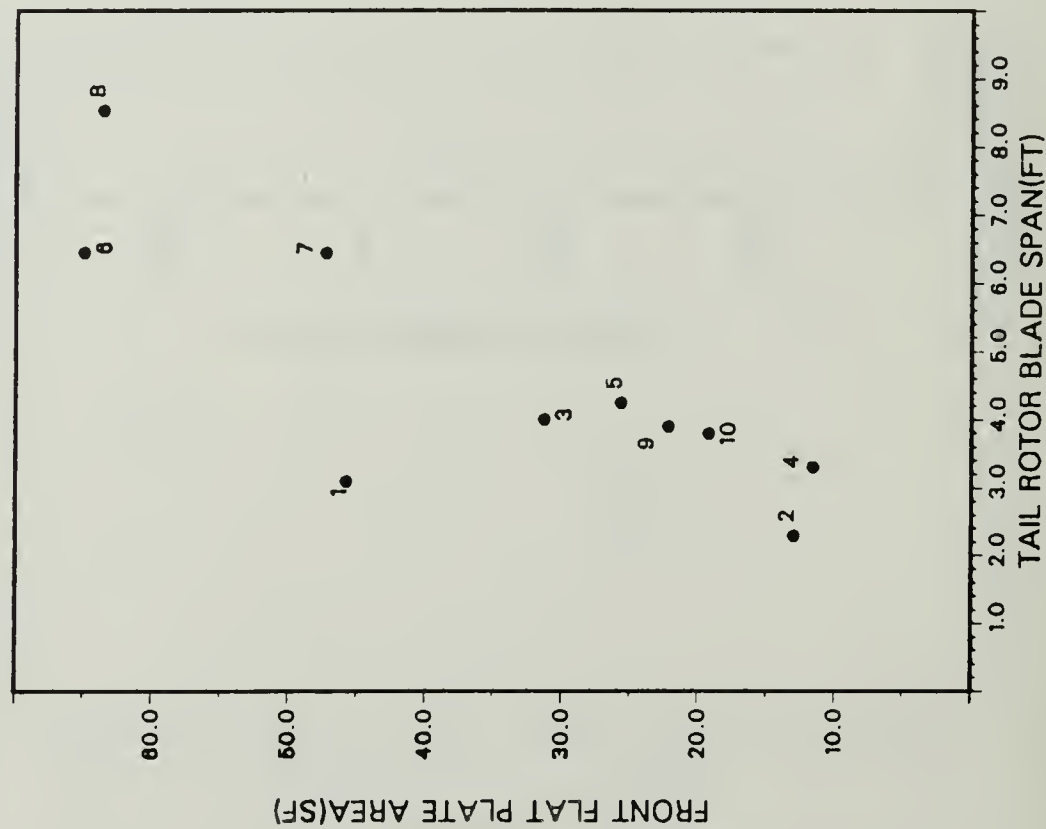


Fig. 11-19a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

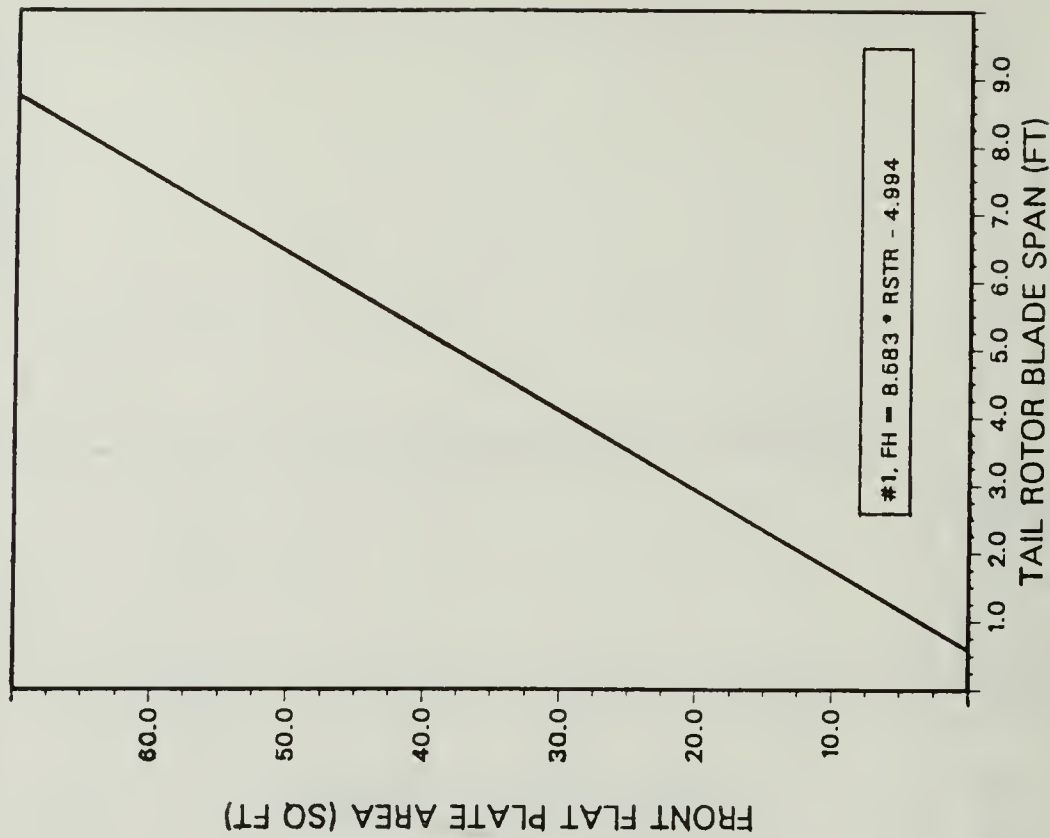


Fig. 11-19b.

Fig. 11-19a and 11-19b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

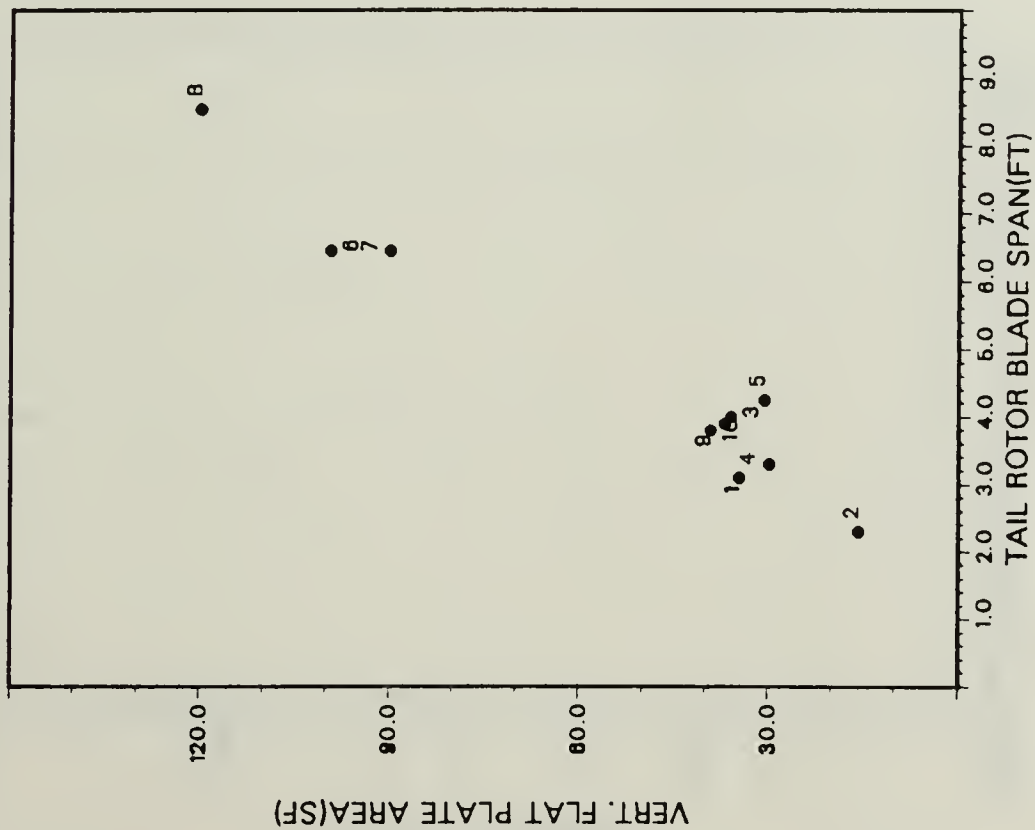


Fig. 11-20.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

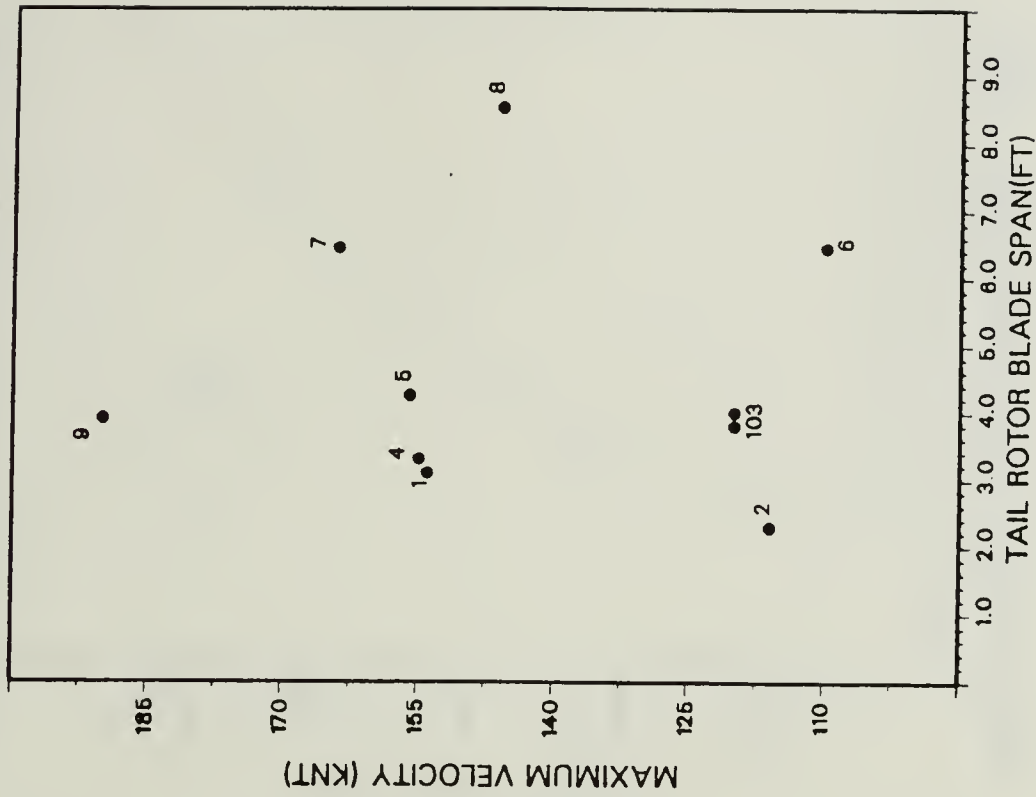


Fig. 11-21.

Fig. 11-20 and 11-21.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

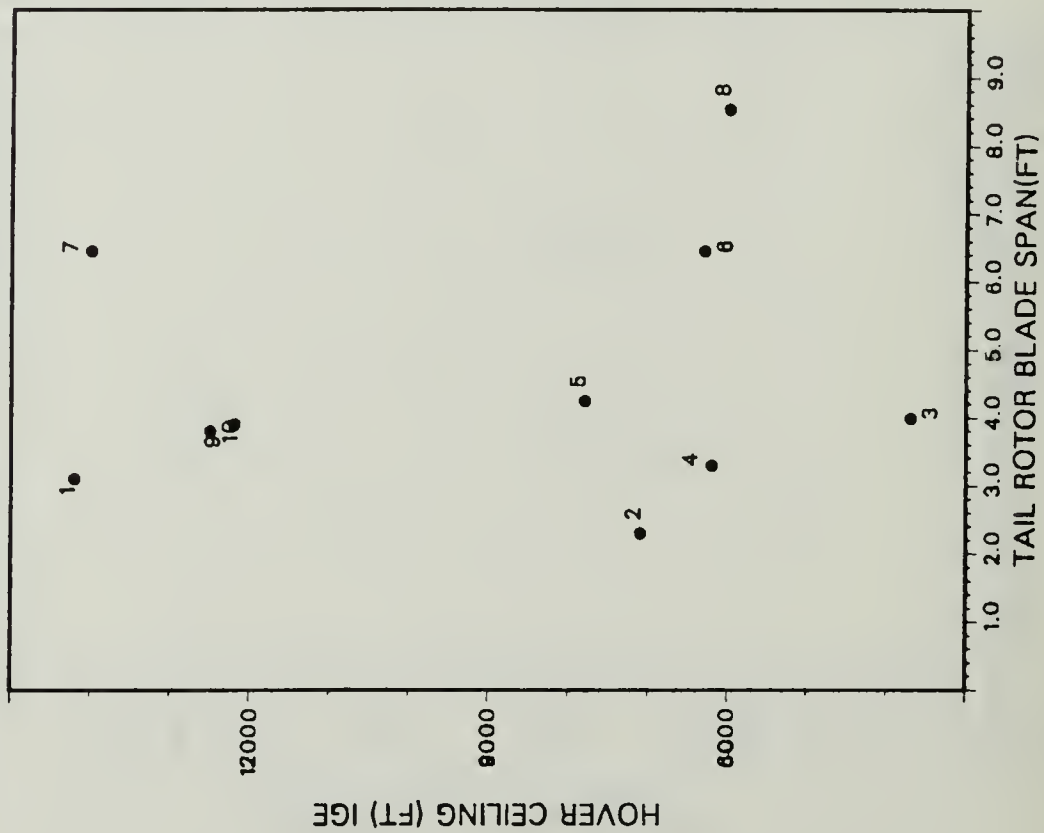


Fig. 11-24.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

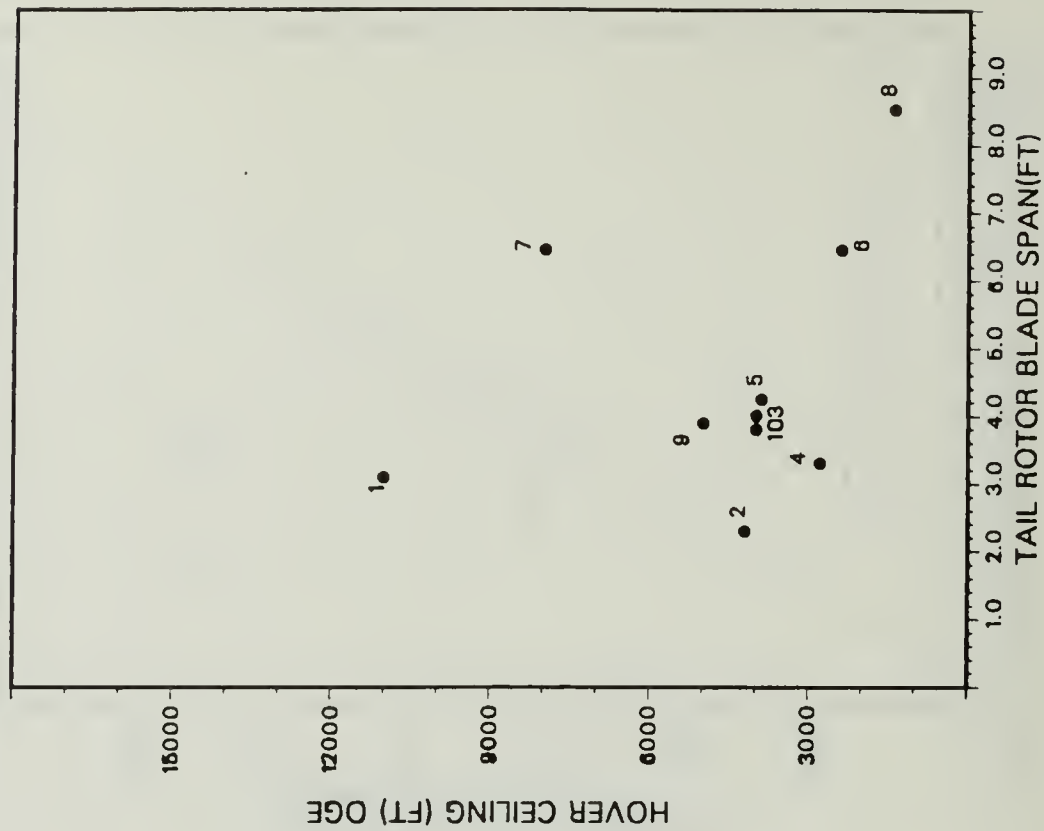


Fig. 11-25.

Fig. 11-24 and 11-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

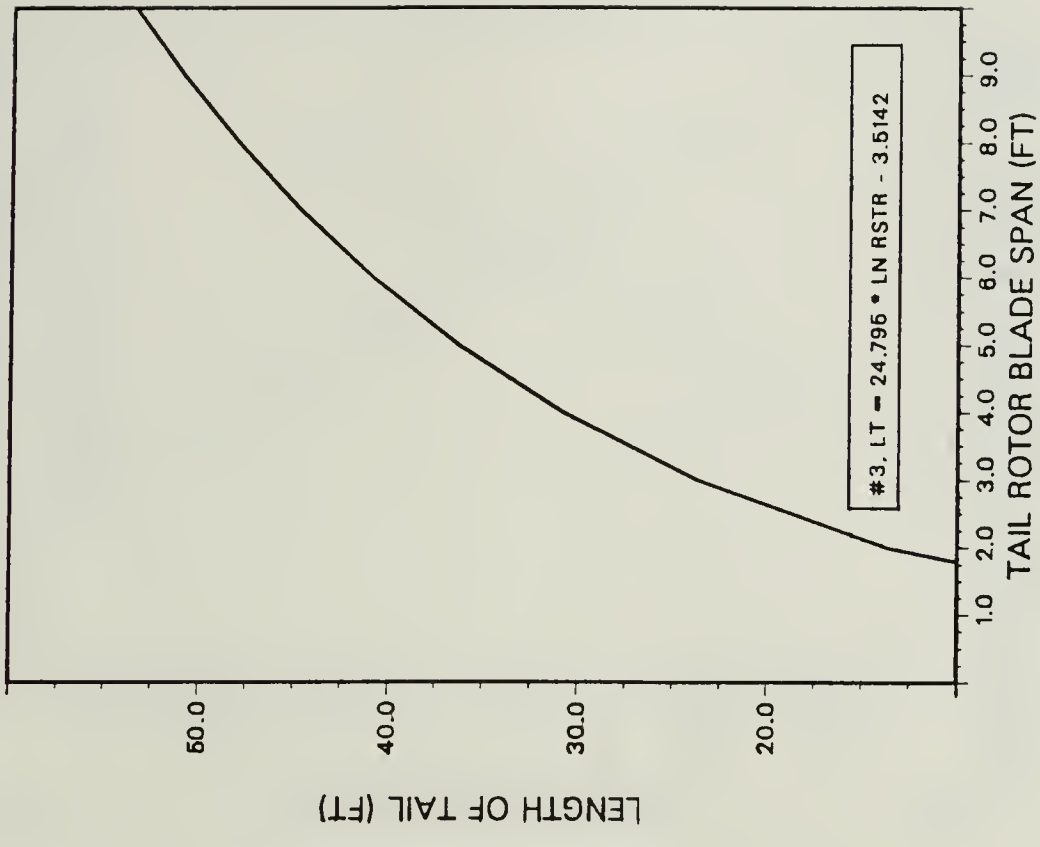


Fig. 11-26b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

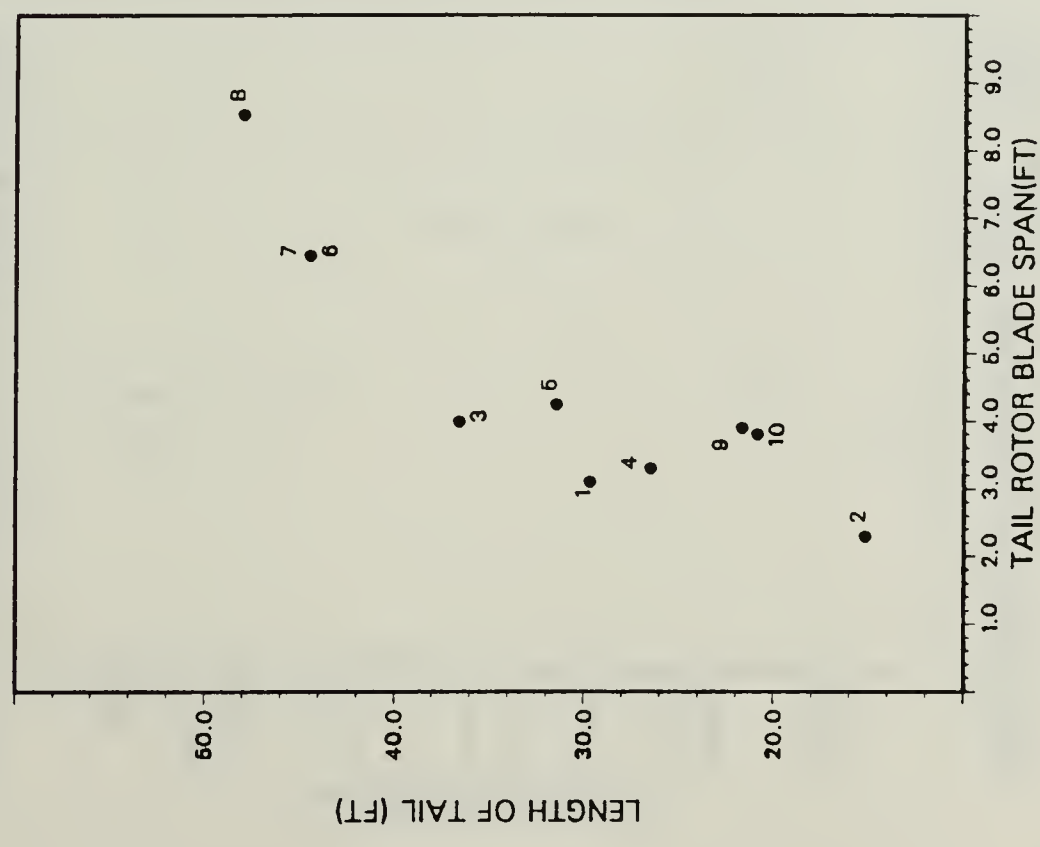


Fig. 11-26a.

Fig. 11-26a and 11-26b.

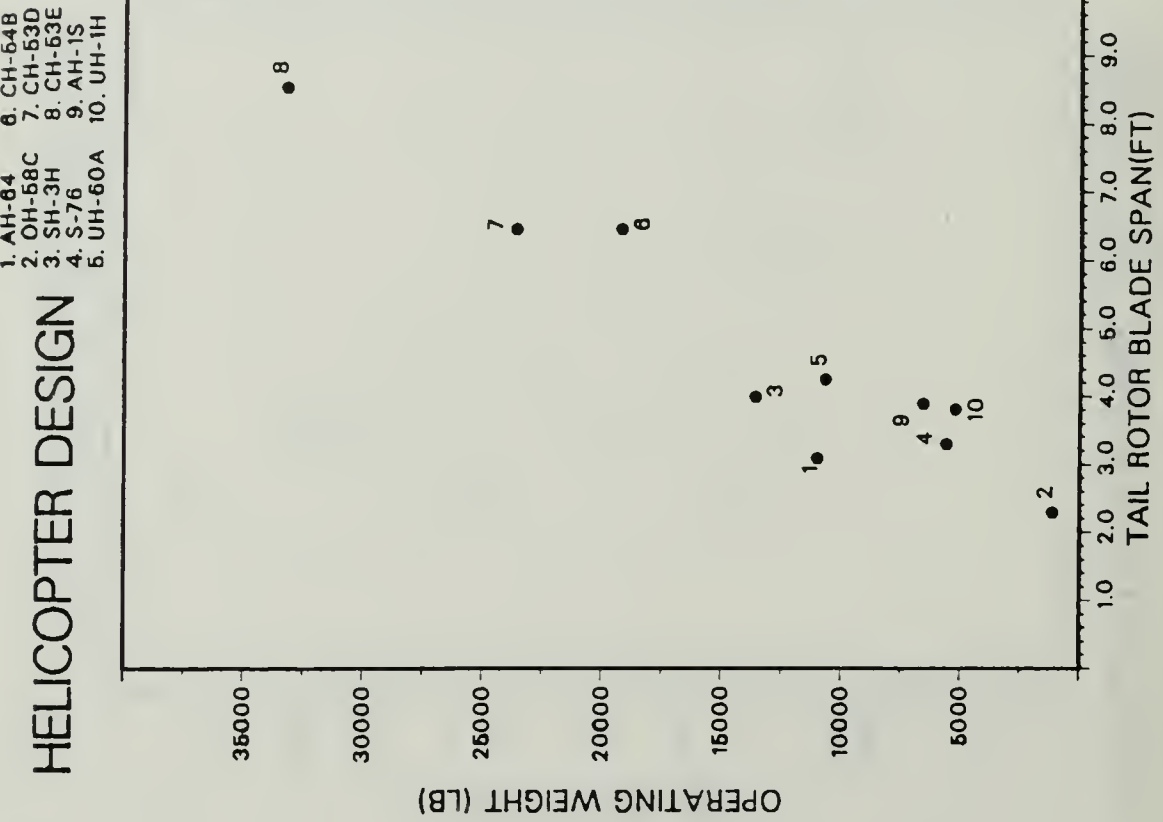


Fig. 11-27a.

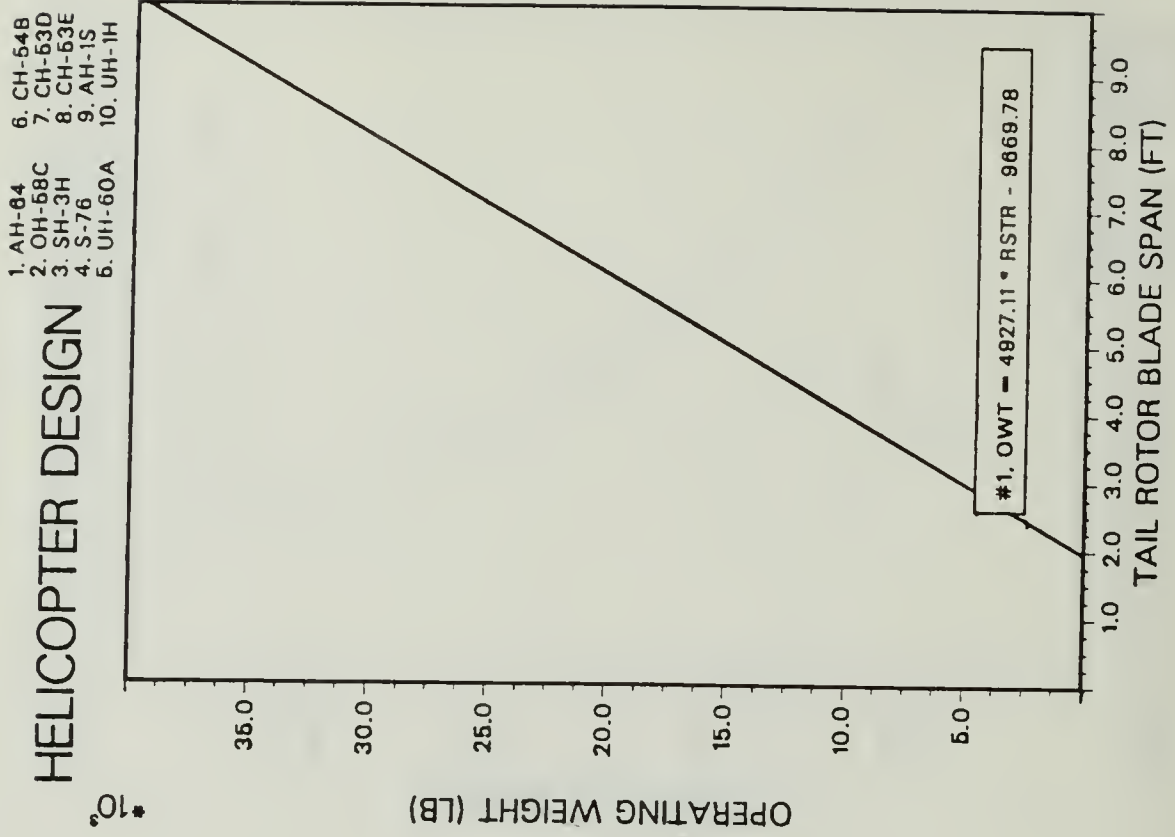


Fig. 11-27b.

Fig. 11-27a and 11-27b.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
6. UH-60A
8. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

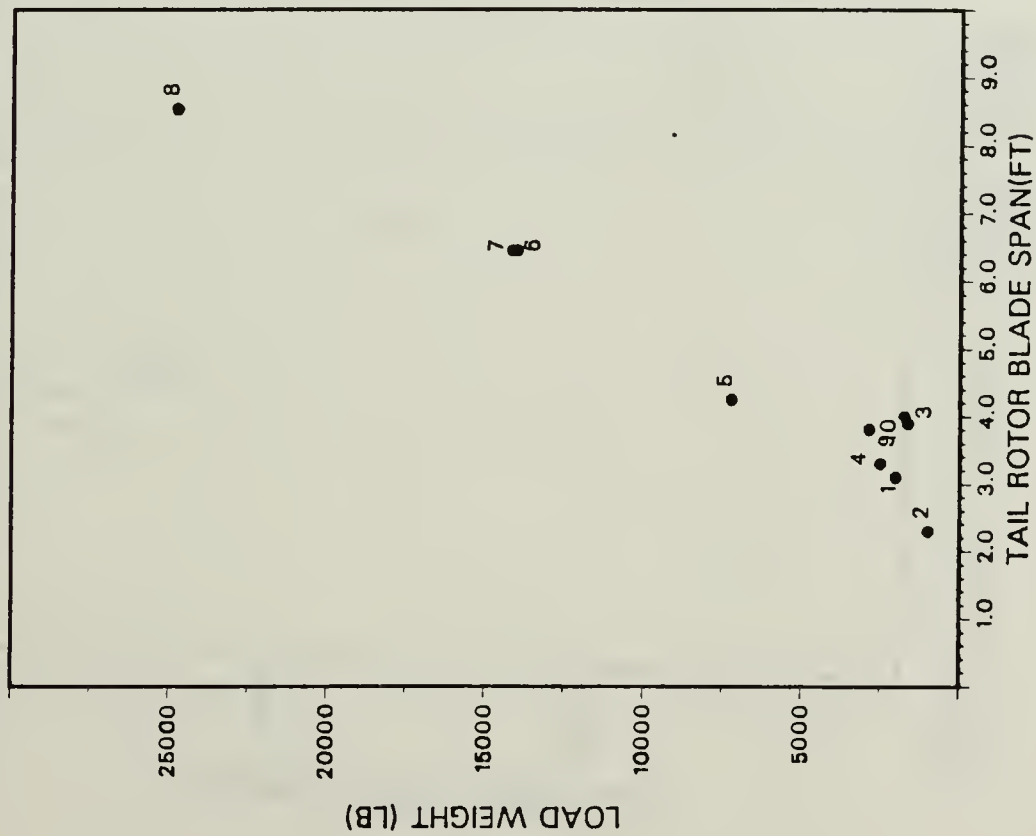


Fig. 11-28a.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
6. UH-60A
8. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

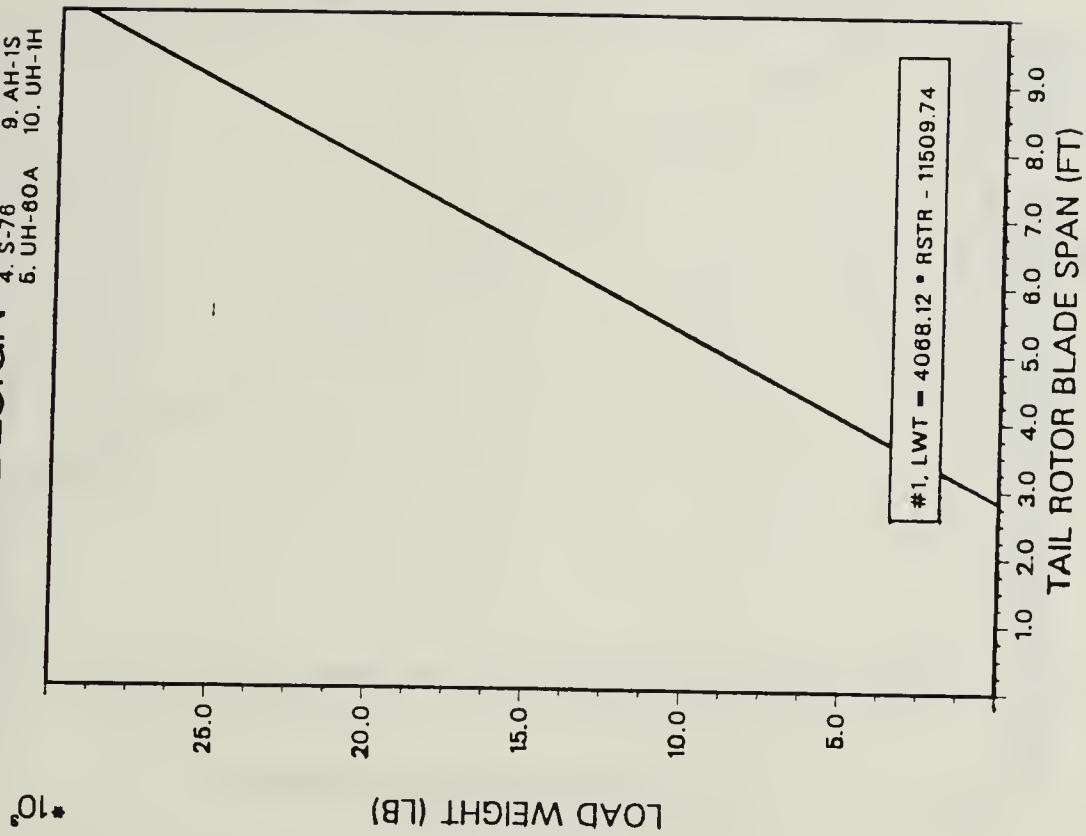


Fig. 11-28b.

Fig. 11-28a and 11-28b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

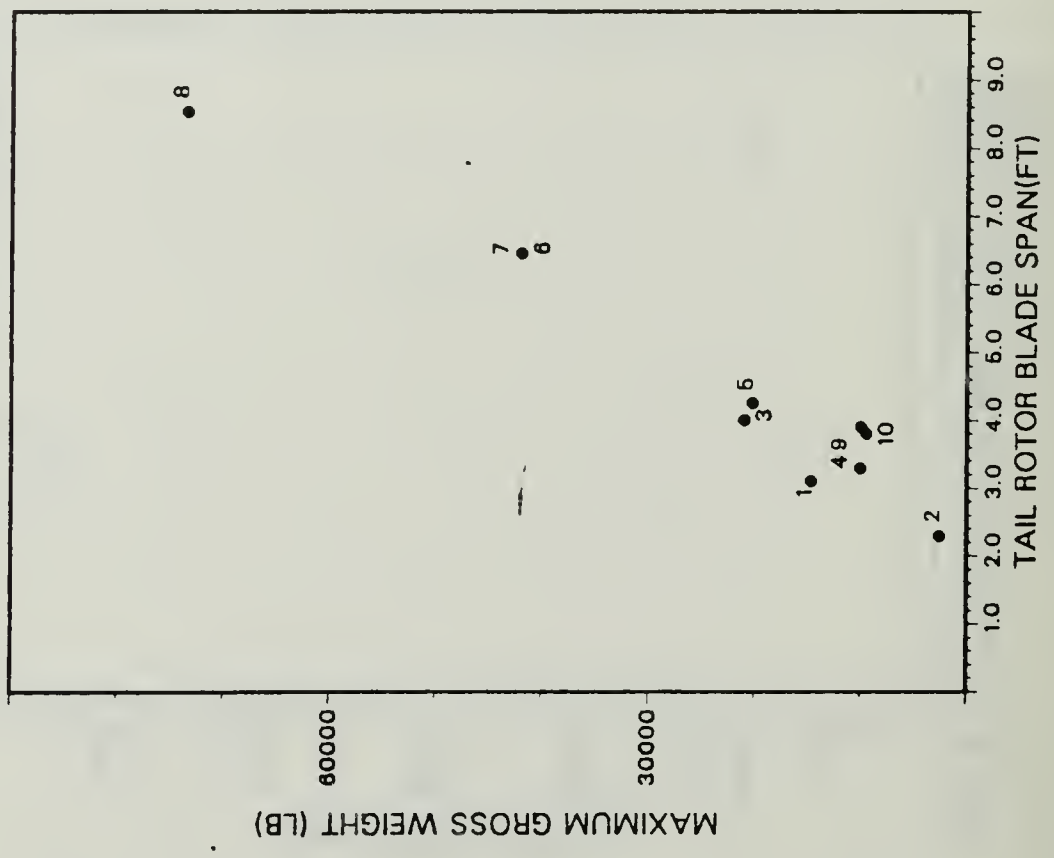


Fig. 11-30a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

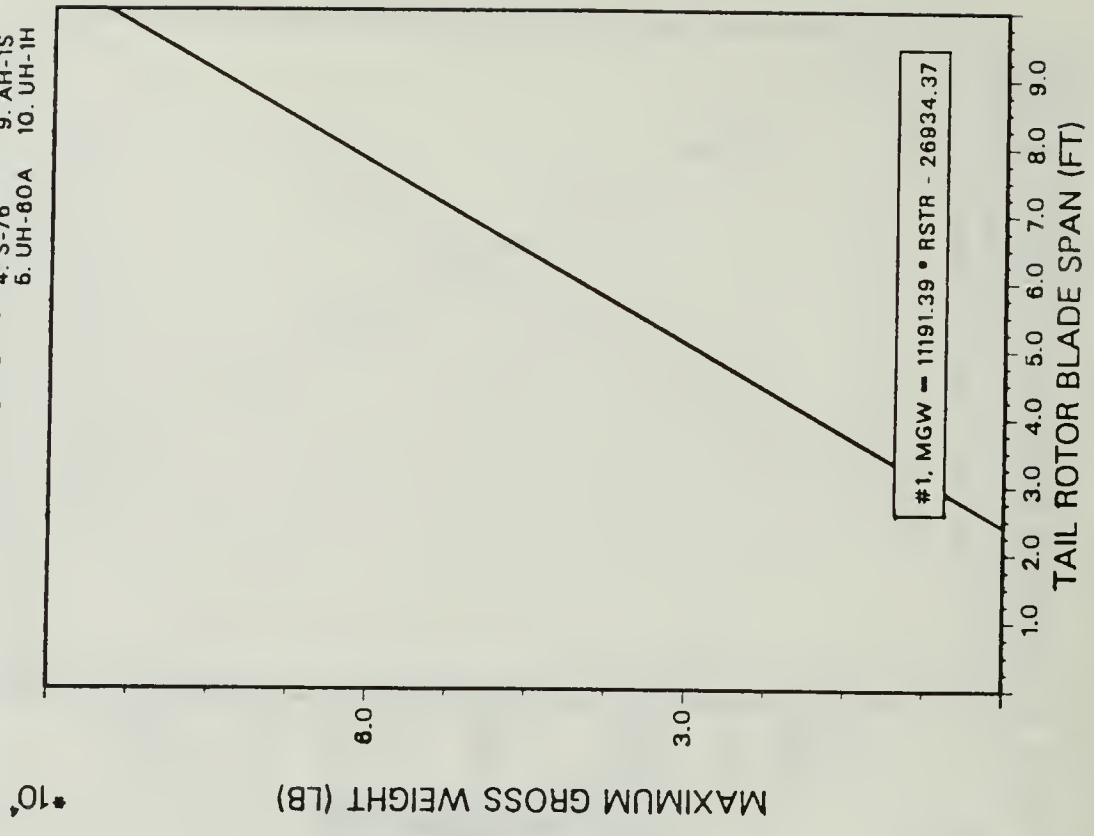


Fig. 11-30b.

Fig. 11-30a and 11-30b.

Twist of Main Rotor Blade Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

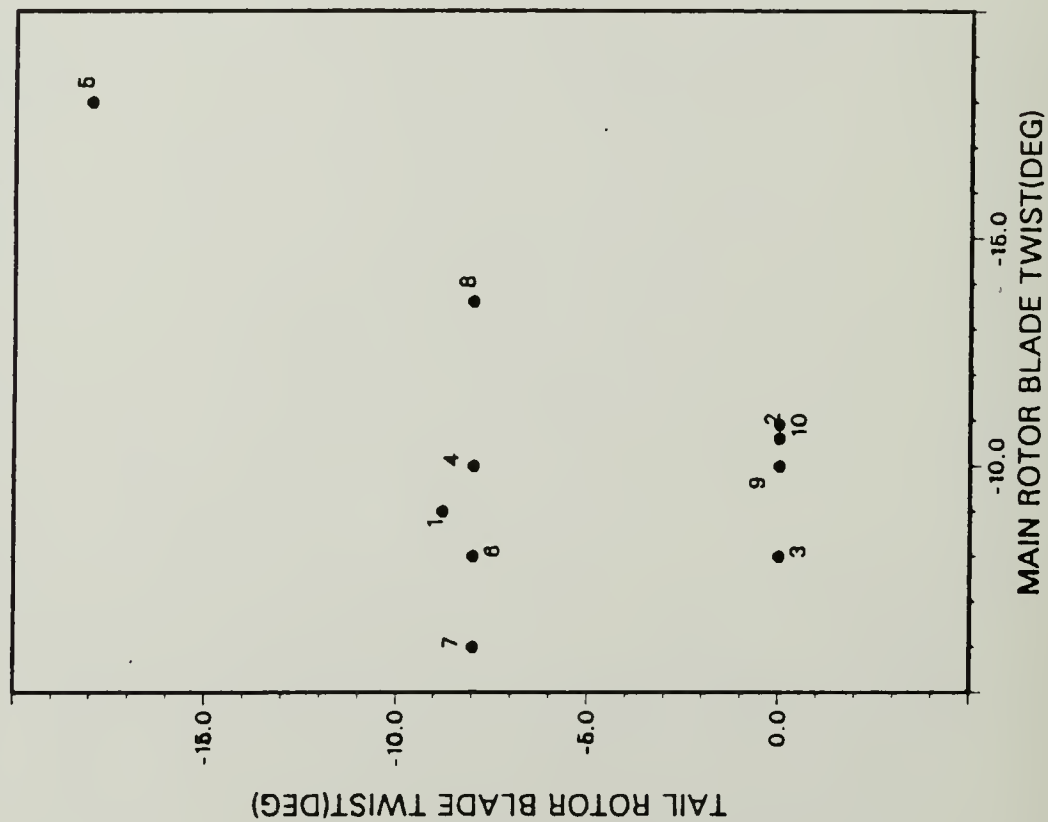


Fig. 12-13.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

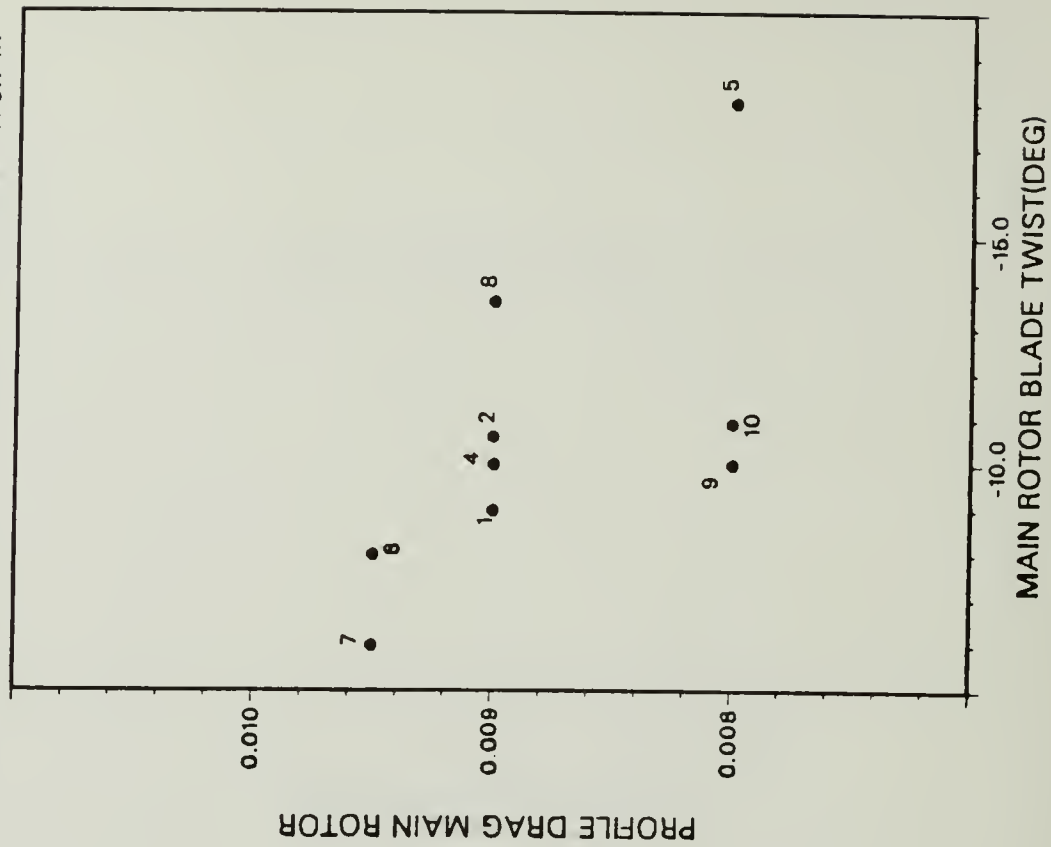


Fig. 12-14.

Fig. 12-13 and 12-14.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

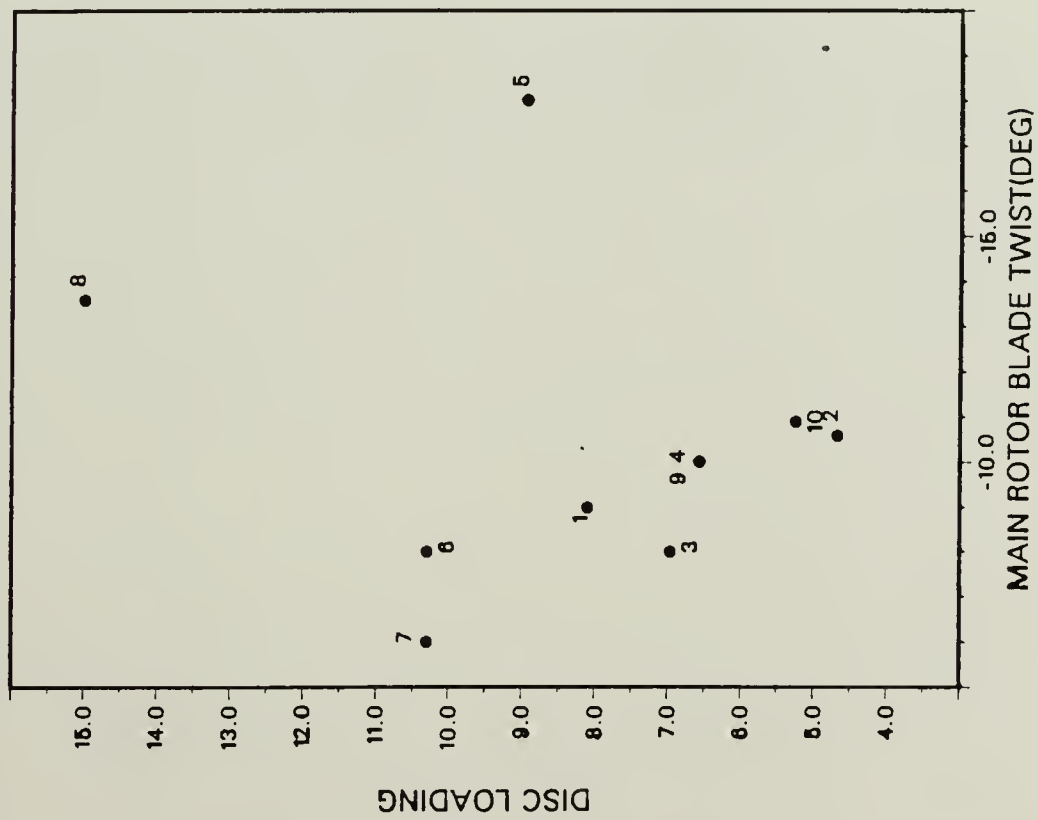


Fig. 12-16.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

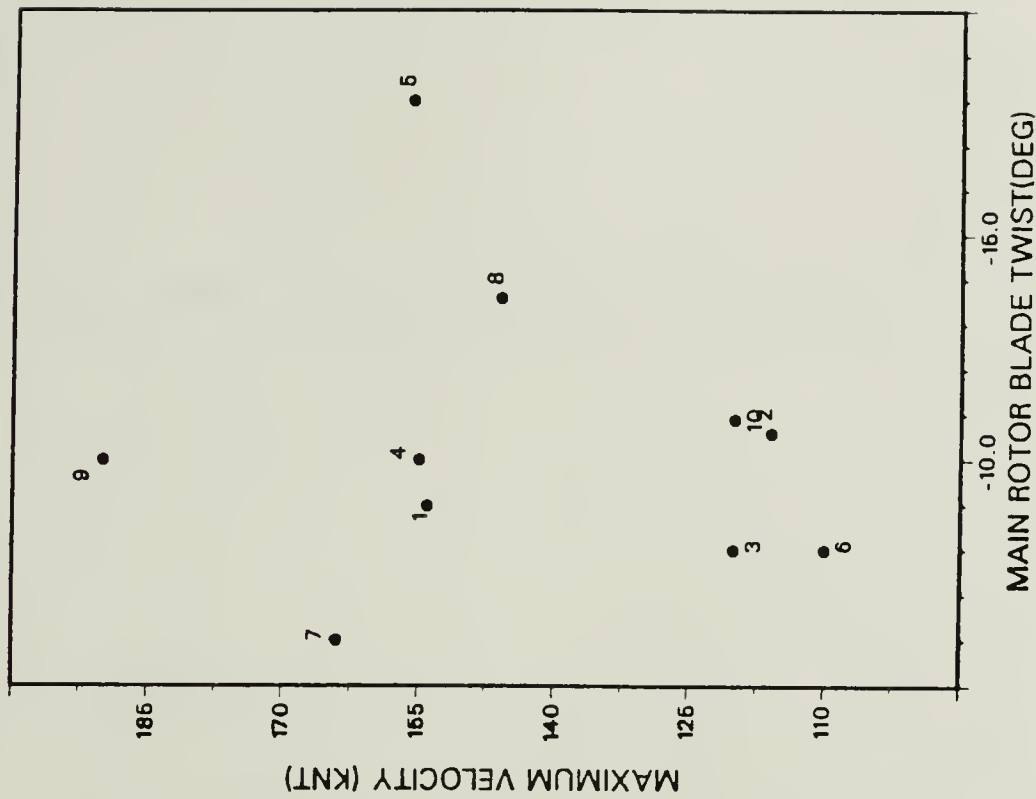


Fig. 12-21.

Fig. 12-16 and 12-21.

Twist of Tail Rotor Blade Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

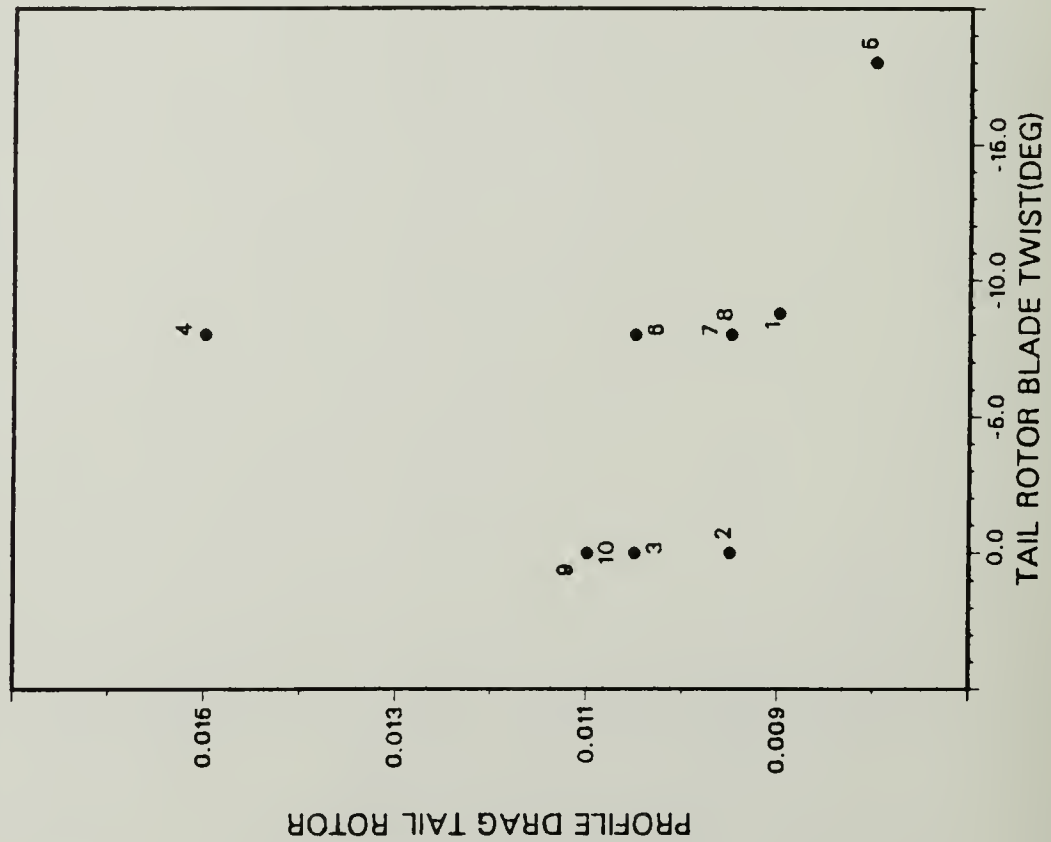


Fig. 13-15.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

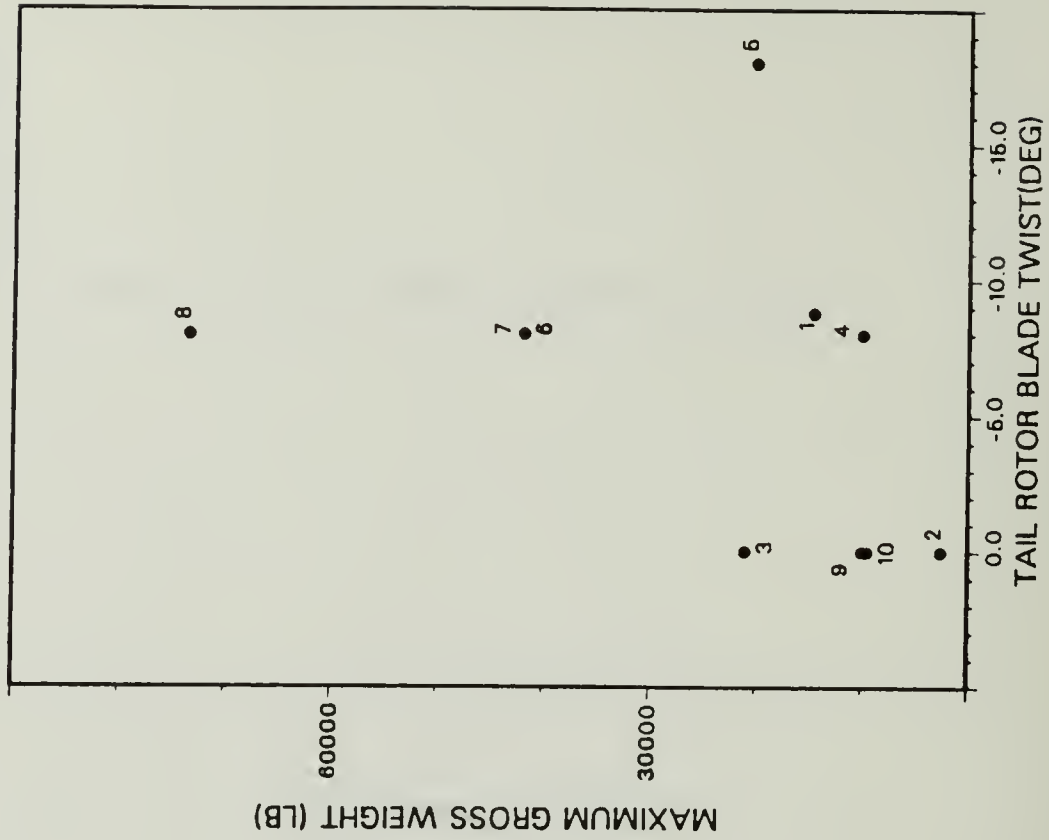


Fig. 13-30.

Fig. 13-15 and 13-30.

Profile Drag of Main Rotor Blade Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

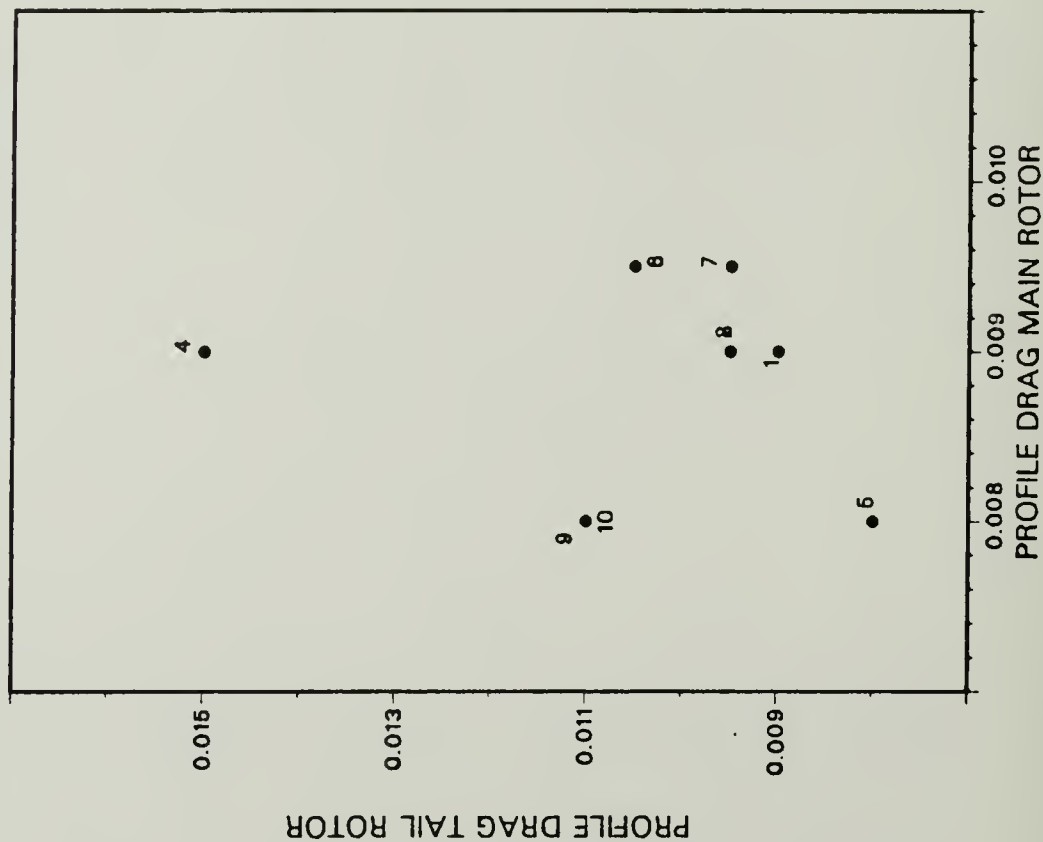


Fig. 14-15.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

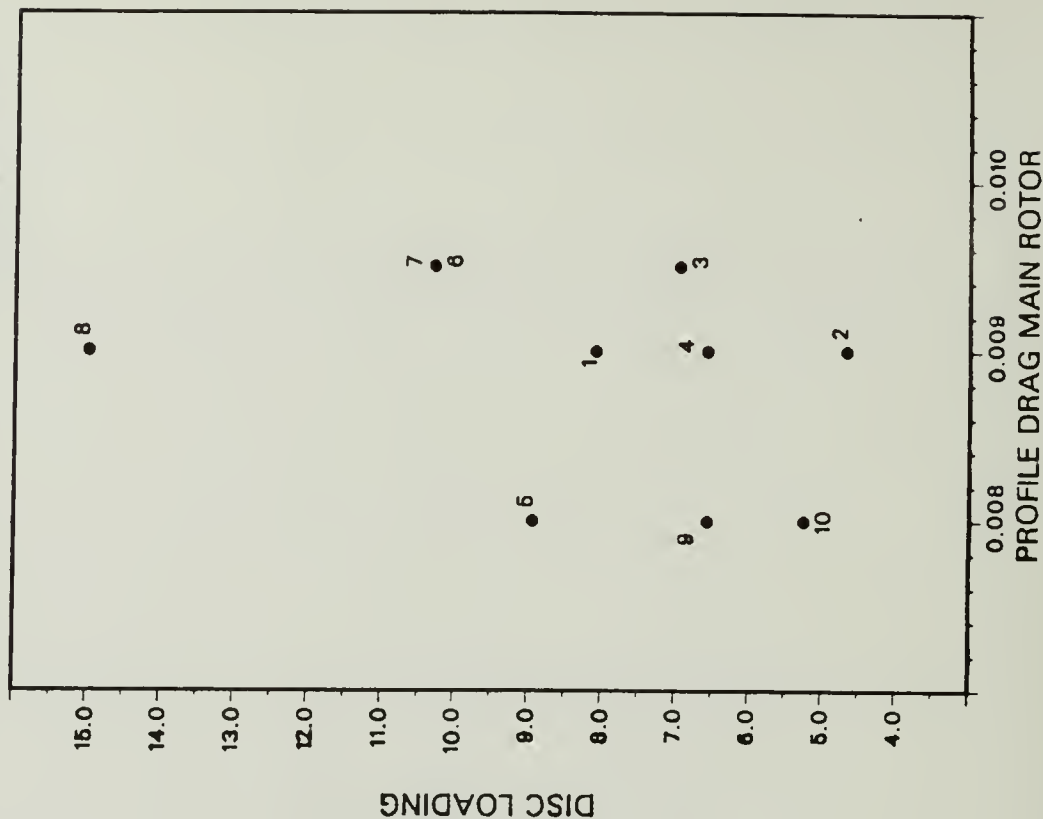


Fig. 14-16.

Fig. 14-15 and 14-16.

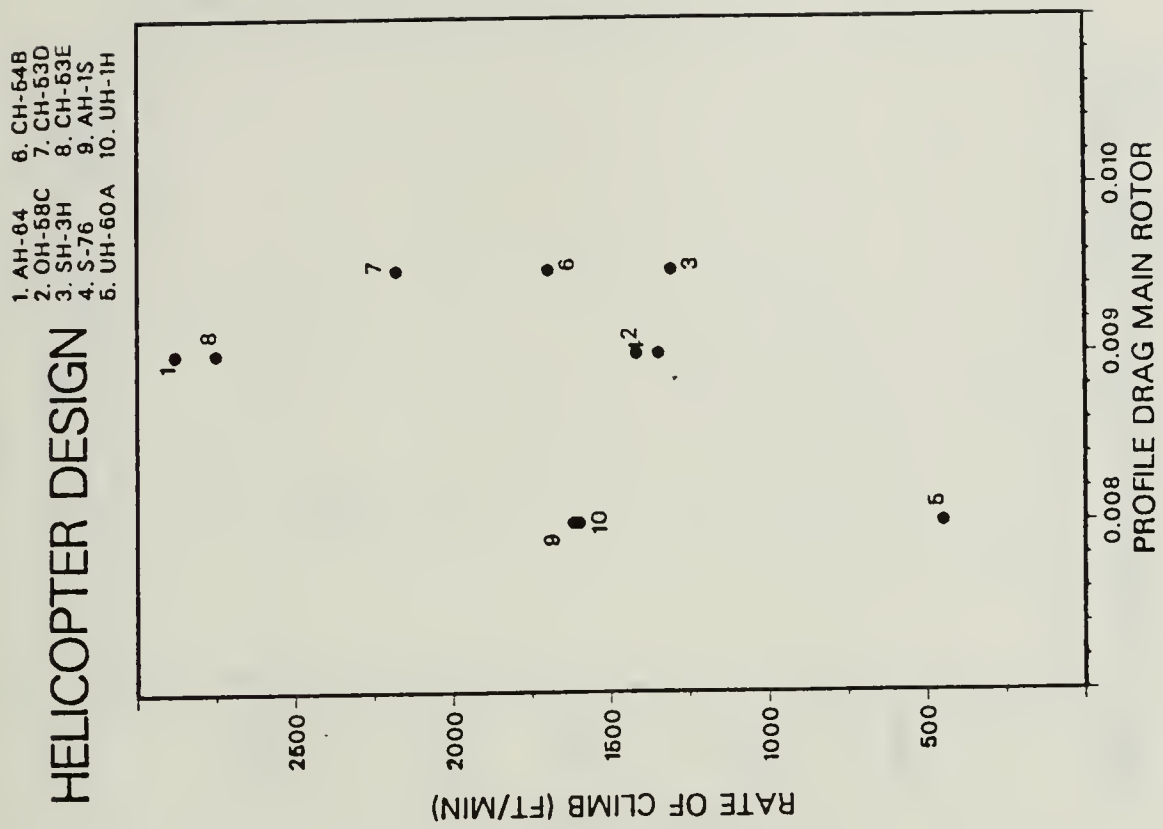


Fig. 14-23.

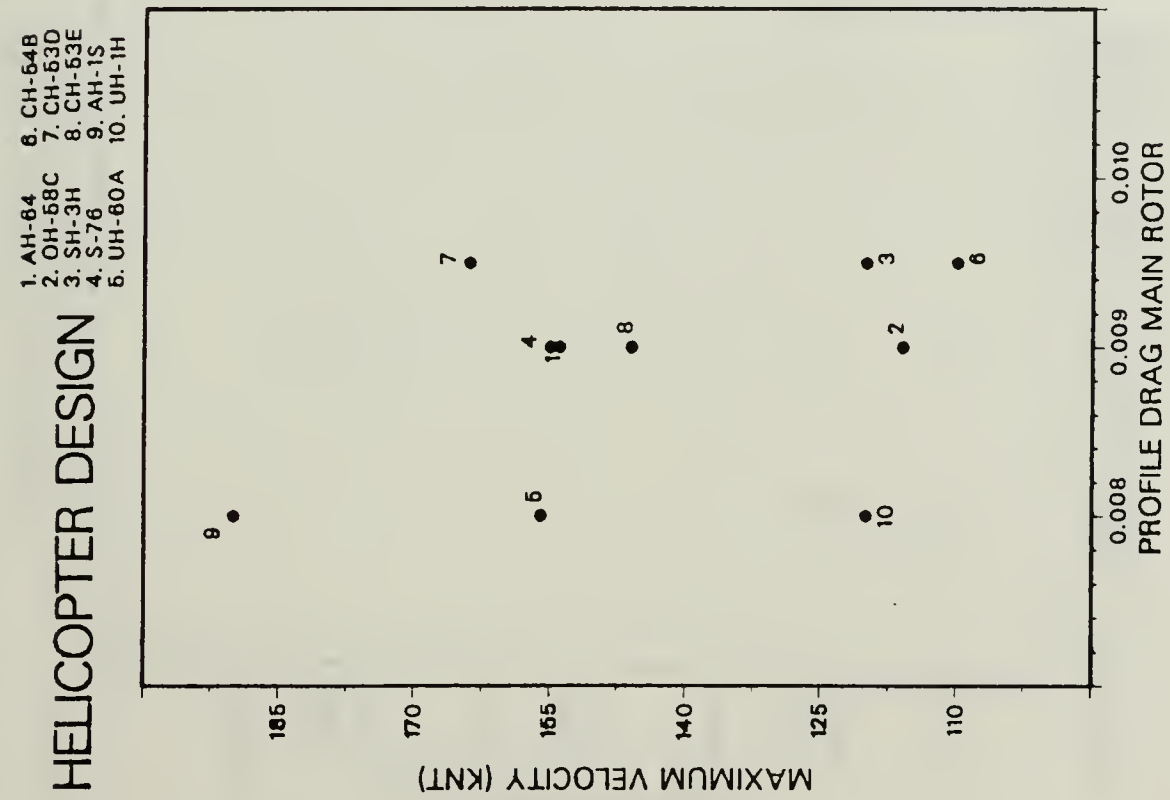


Fig. 14-21.

Fig. 14-21 and 14-23.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

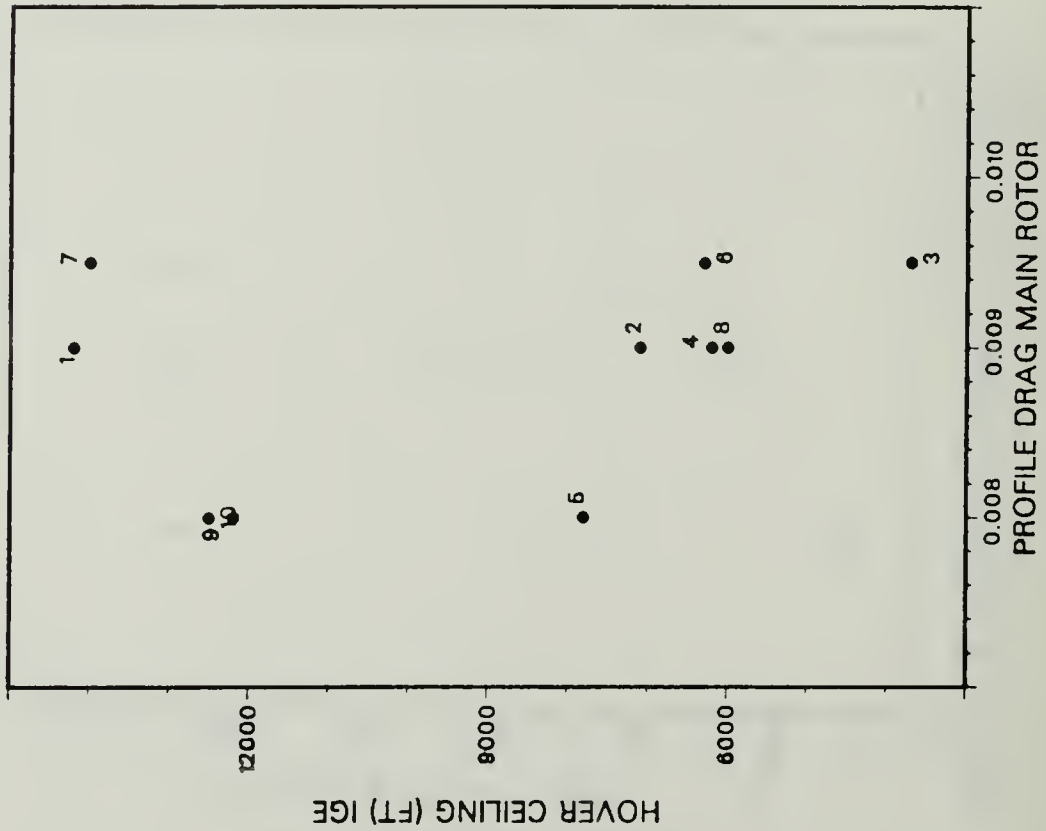


Fig. 14-24.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

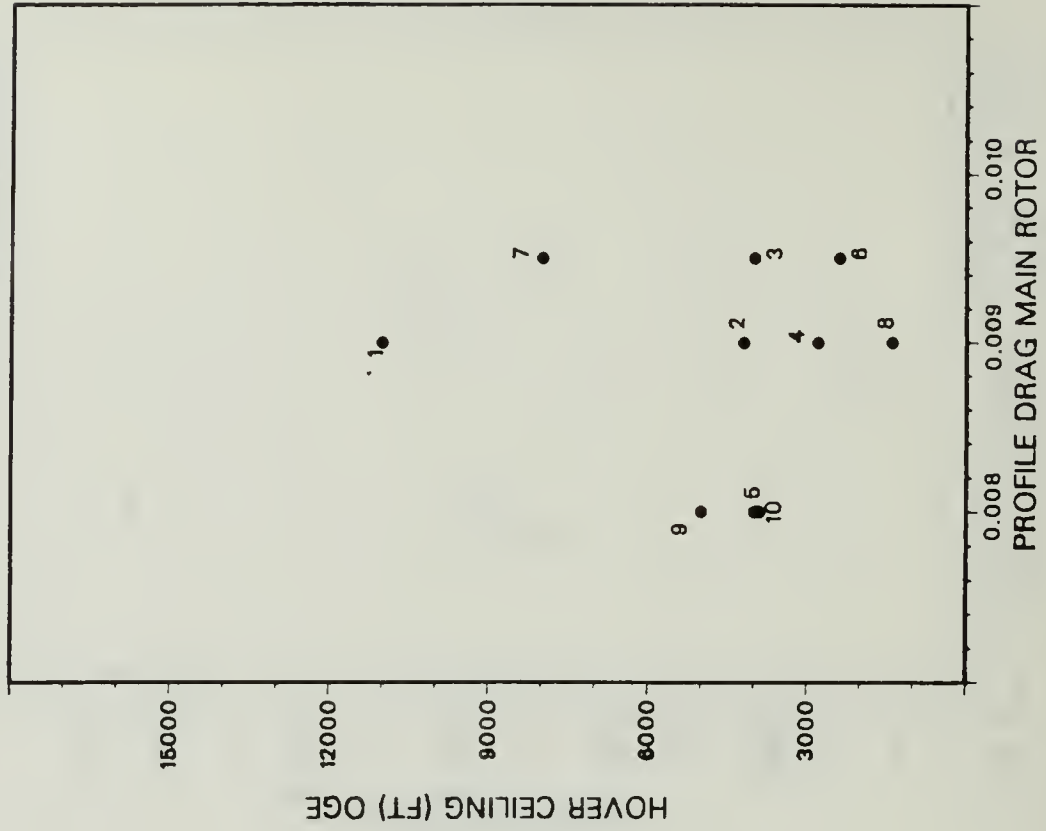


Fig. 14-25.

Fig. 14-24 and 14-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

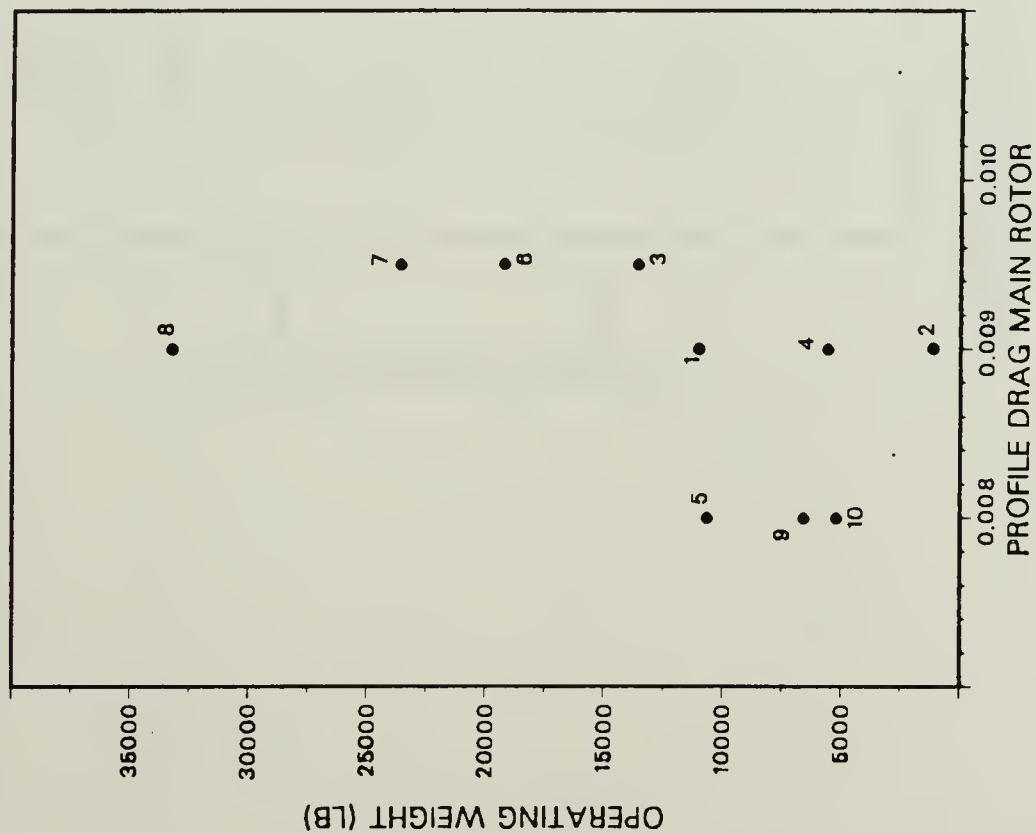


Fig. 14-27.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

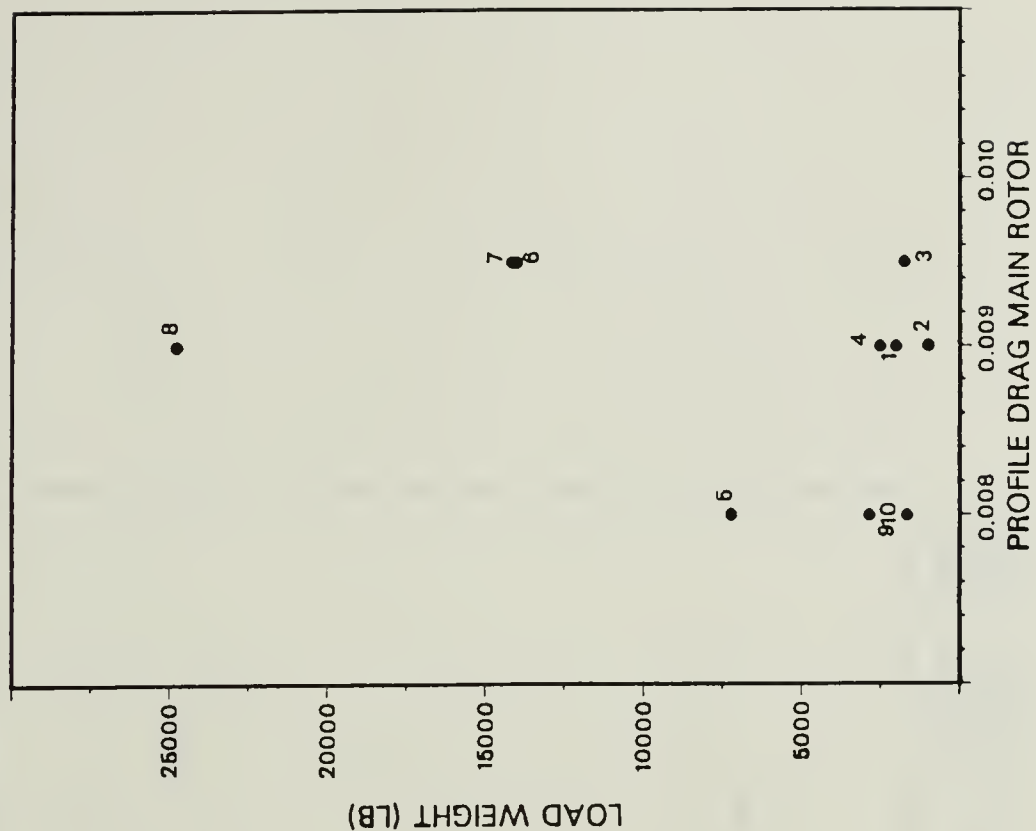


Fig. 14-28.

Fig. 14-27 and 14-28.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

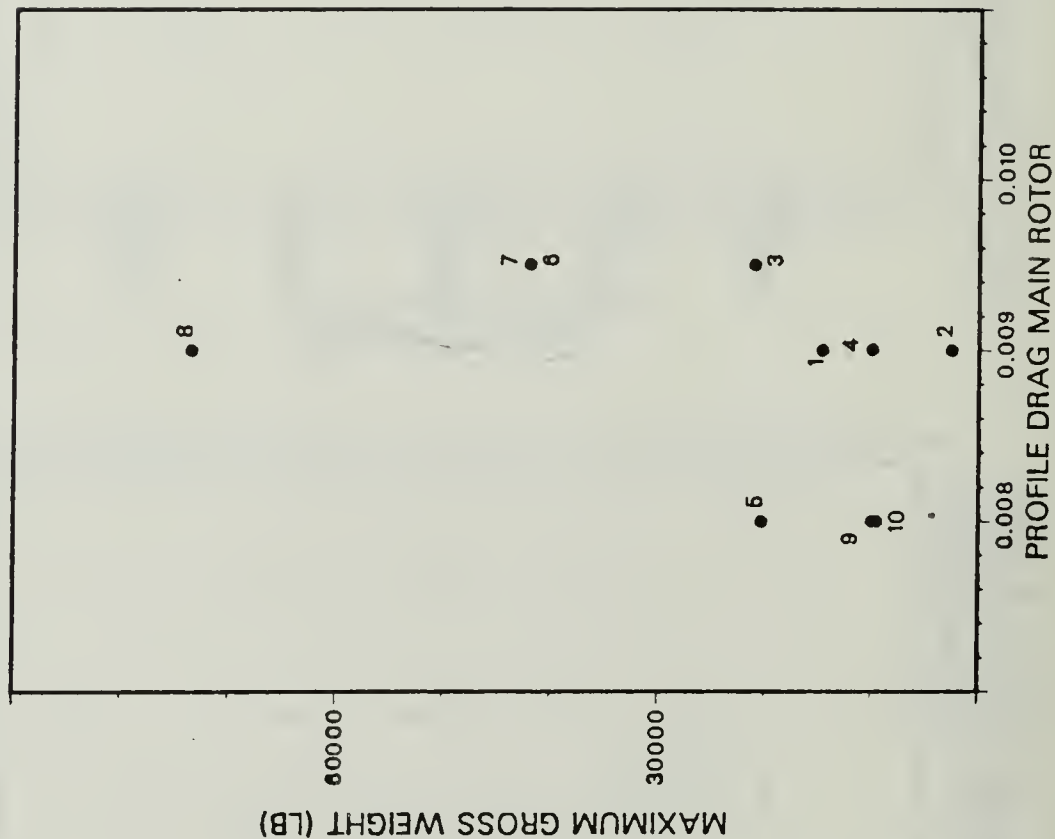


Fig. 14-30.

Fig. 14-30.

Profile Drag of Tail Rotor Blade Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

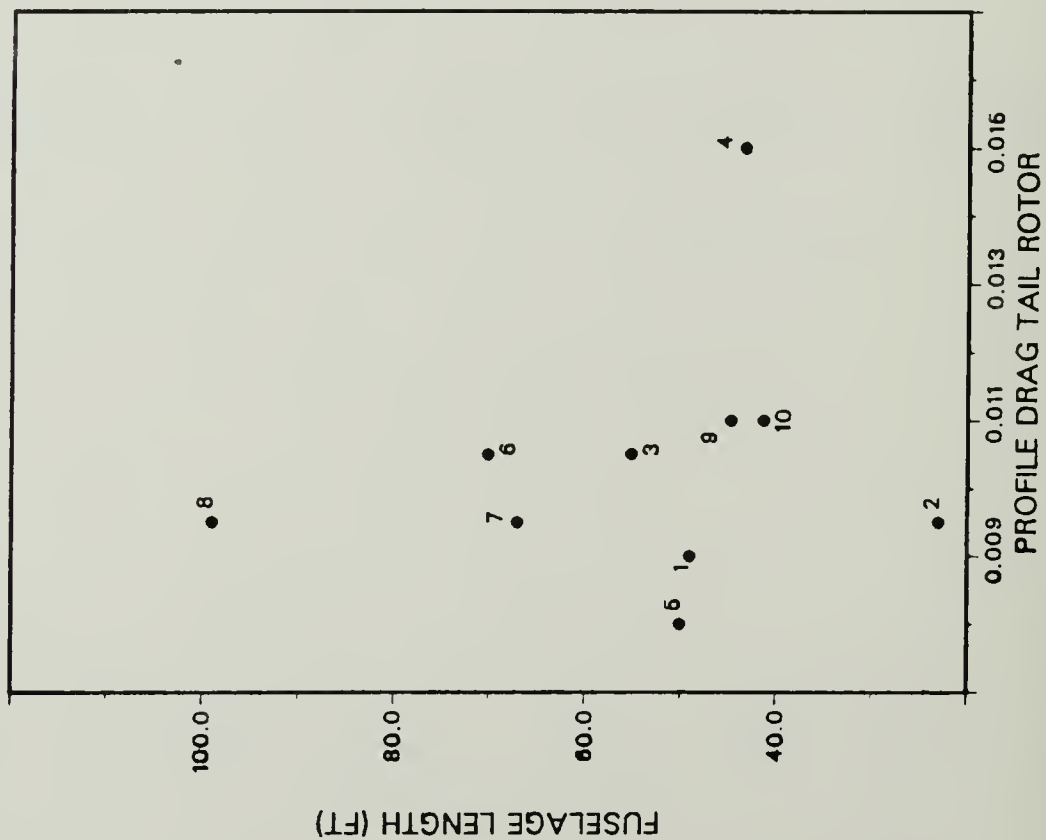


Fig. 15-18.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

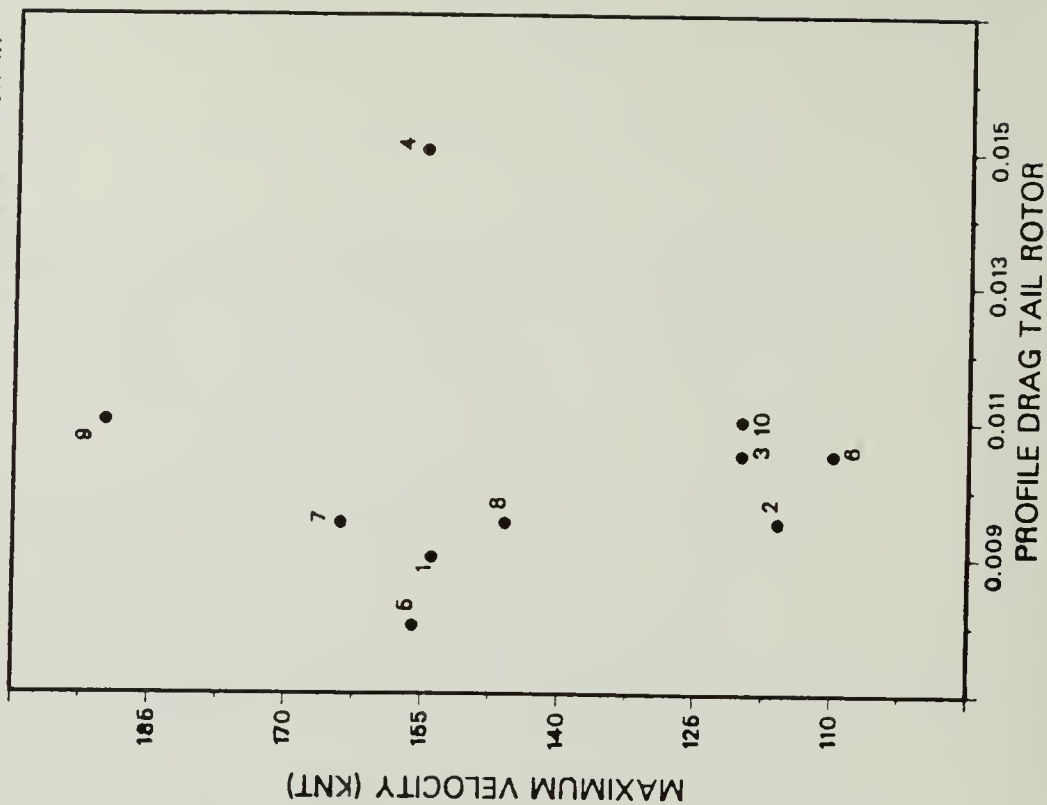


Fig. 15-21.

Fig. 15-18 and 15-21.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

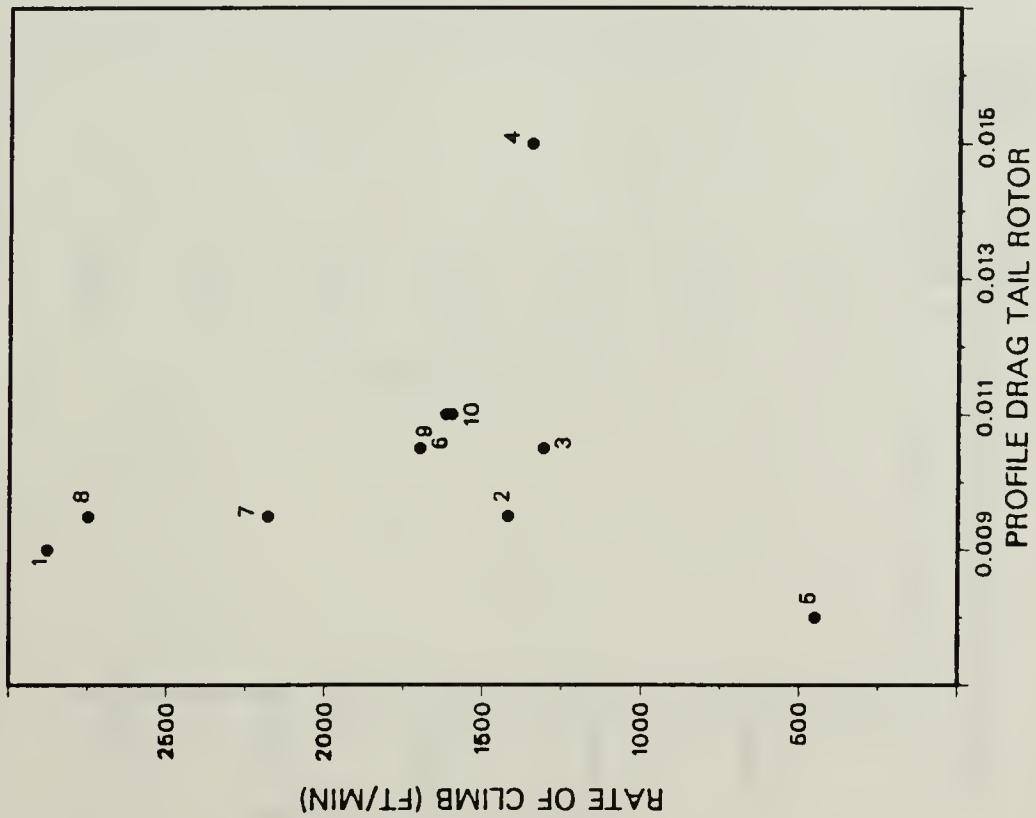


Fig. 15-23.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

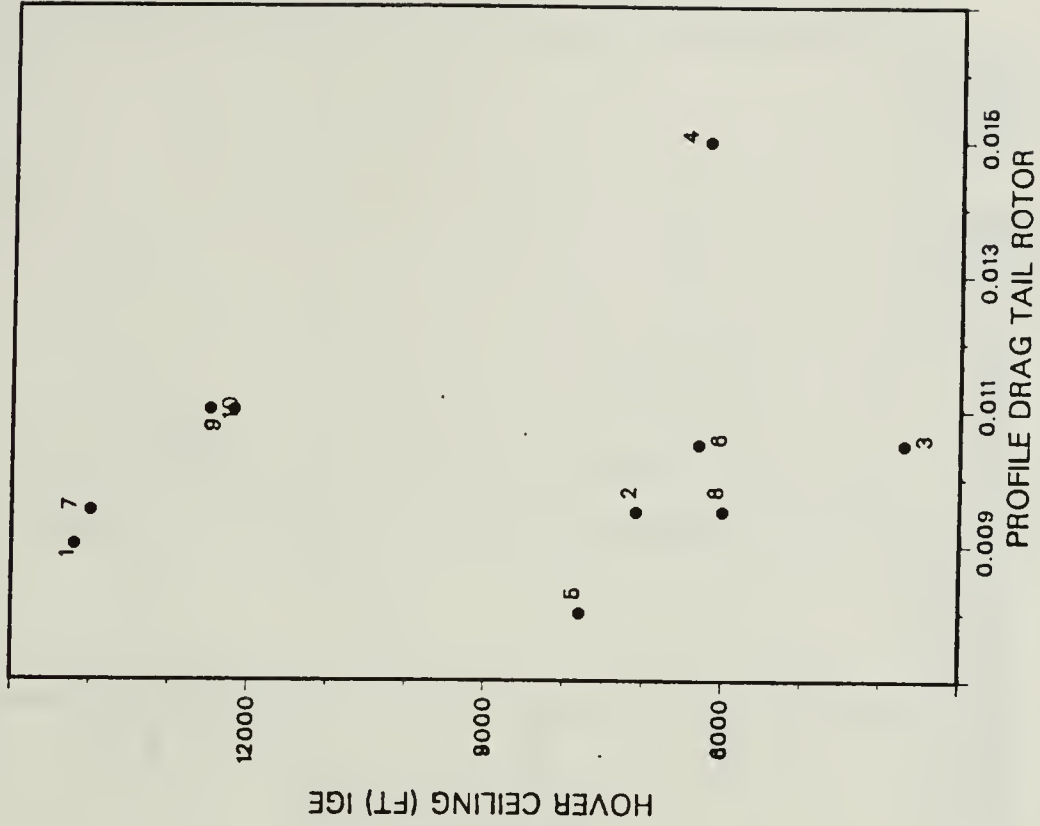


Fig. 15-24.

Fig. 15-23 and 15-24.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

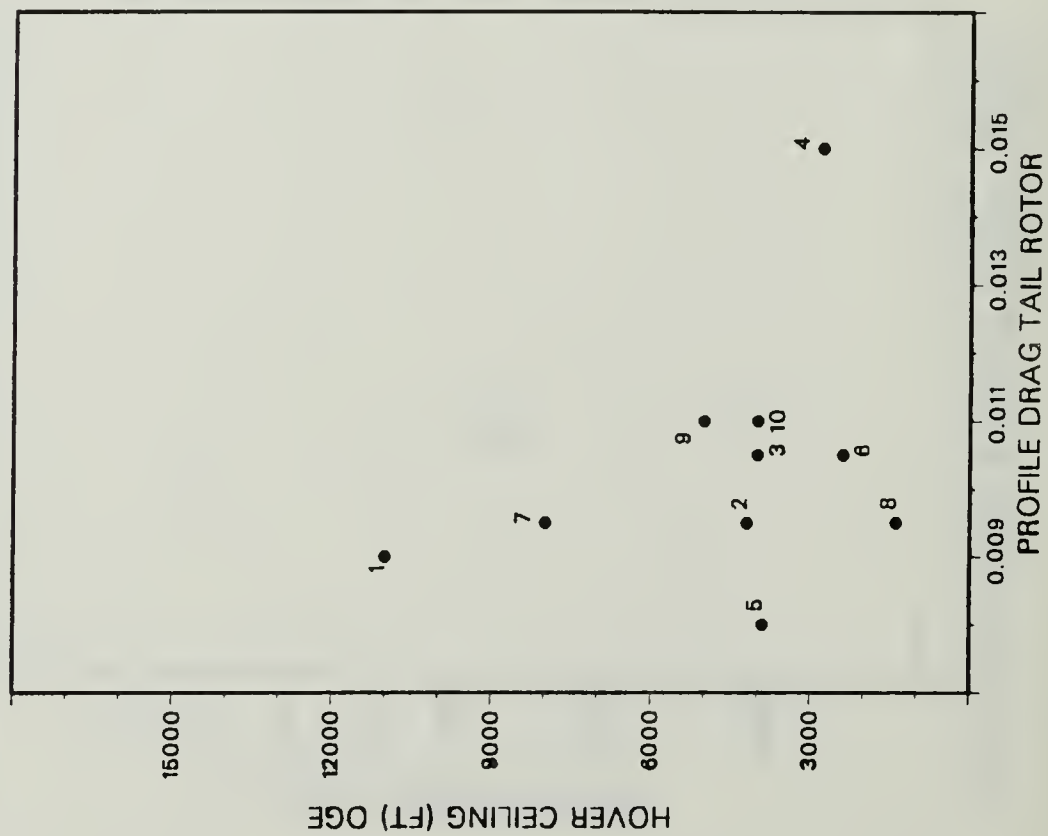


Fig. 15-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

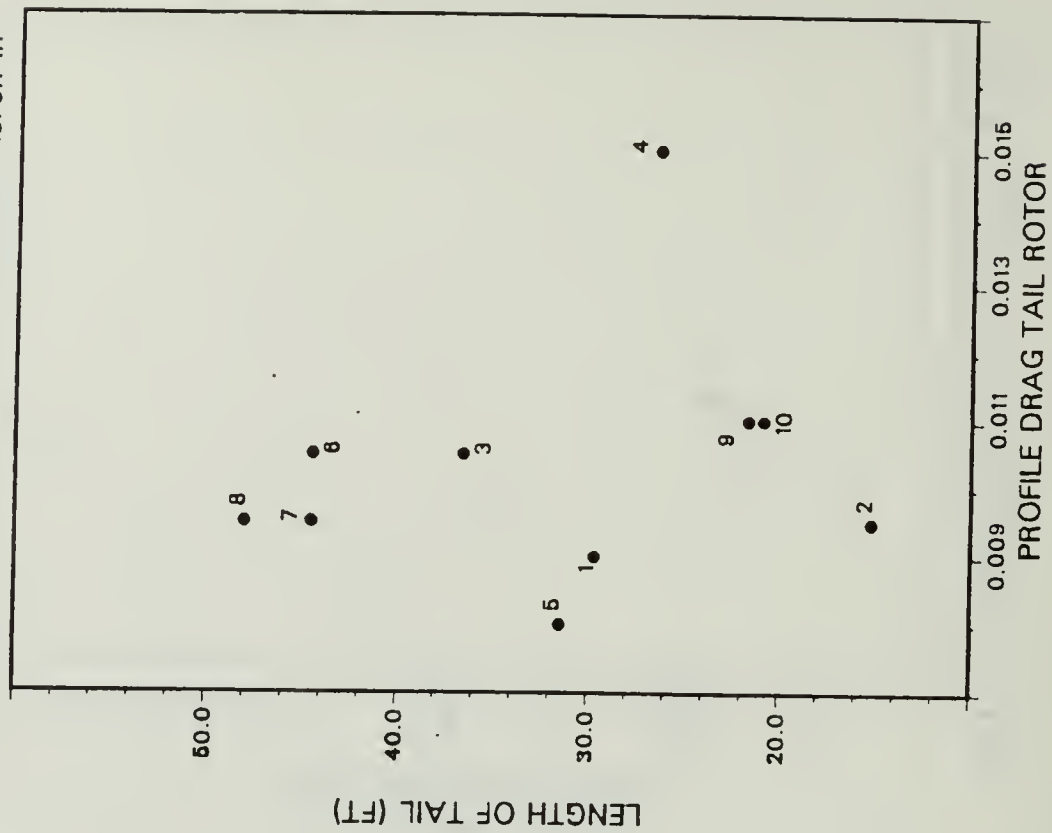


Fig. 15-26.

Fig. 15-25 and 15-26.

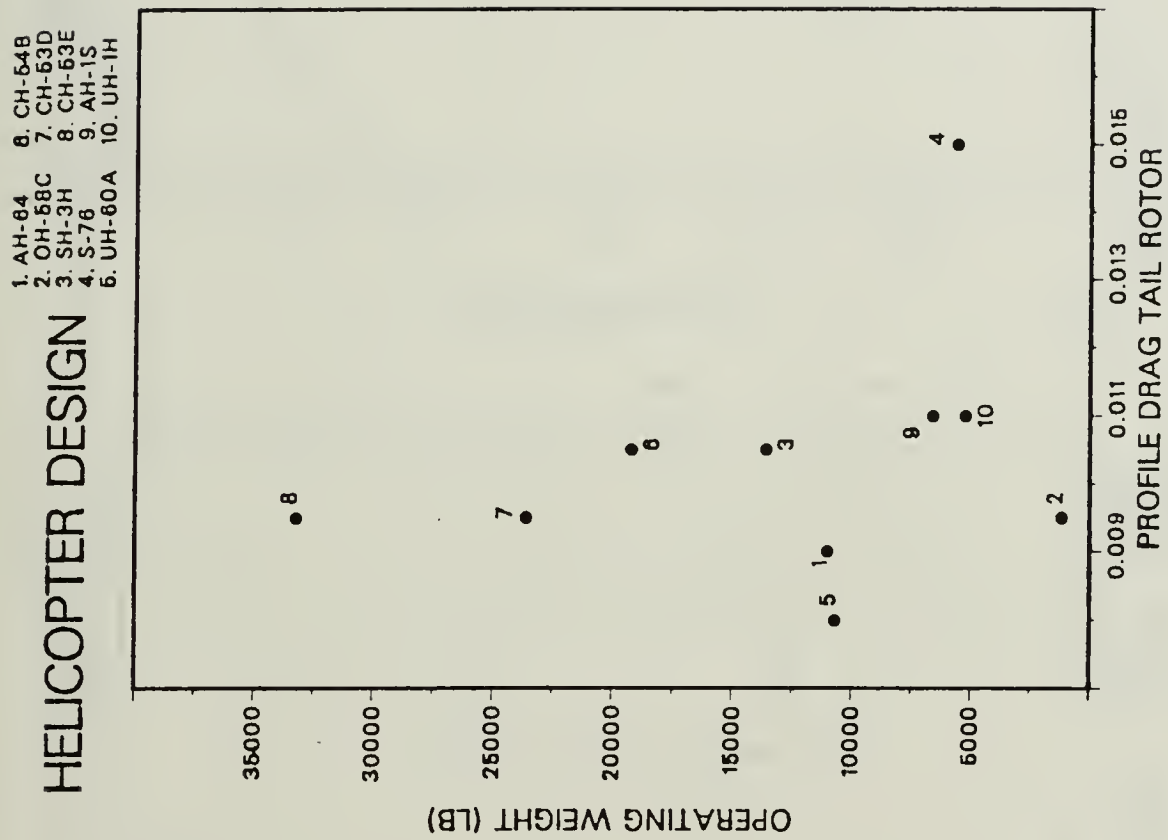


Fig. 15-27.

Fig. 15-27.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

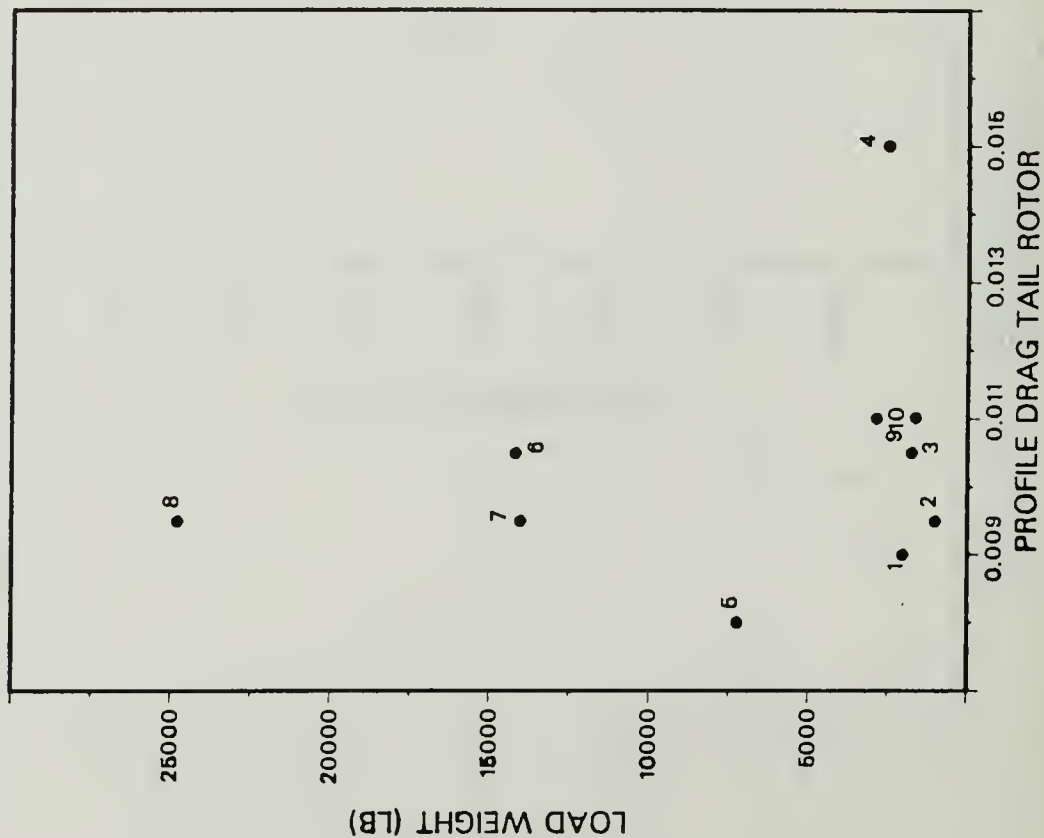


Fig. 15-28a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

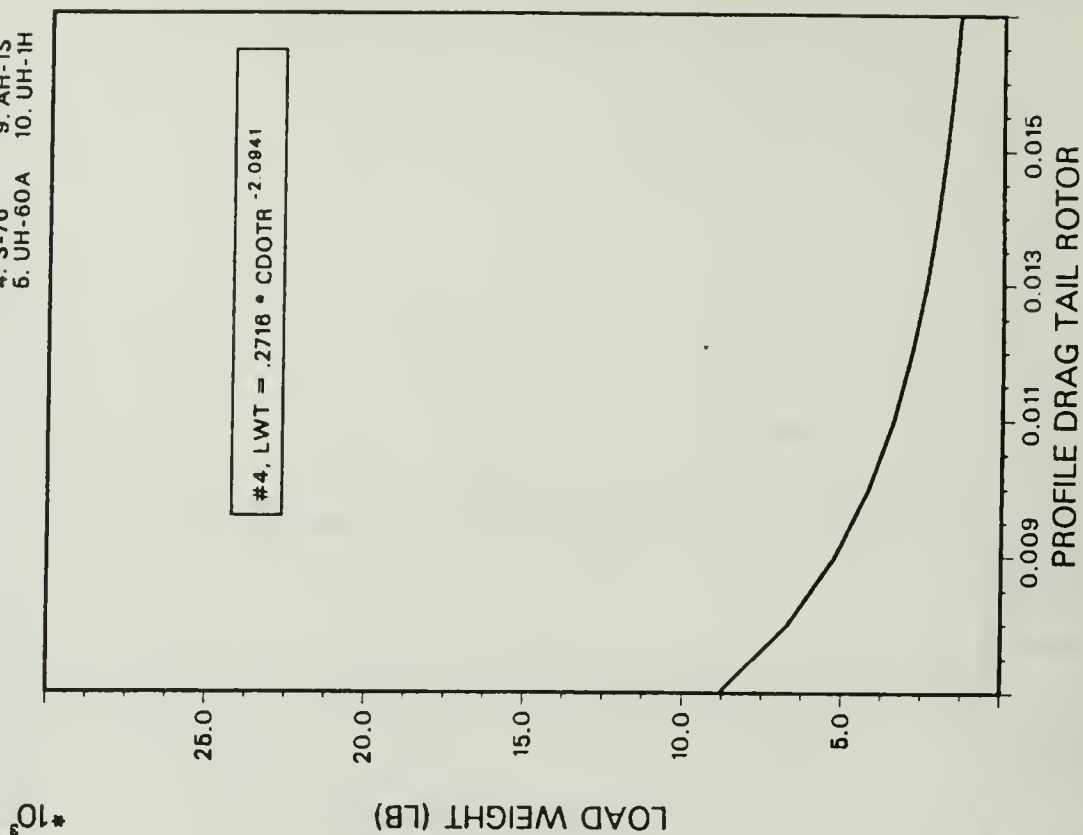


Fig. 15-28b.

Fig. 15-28a and 15-28b.

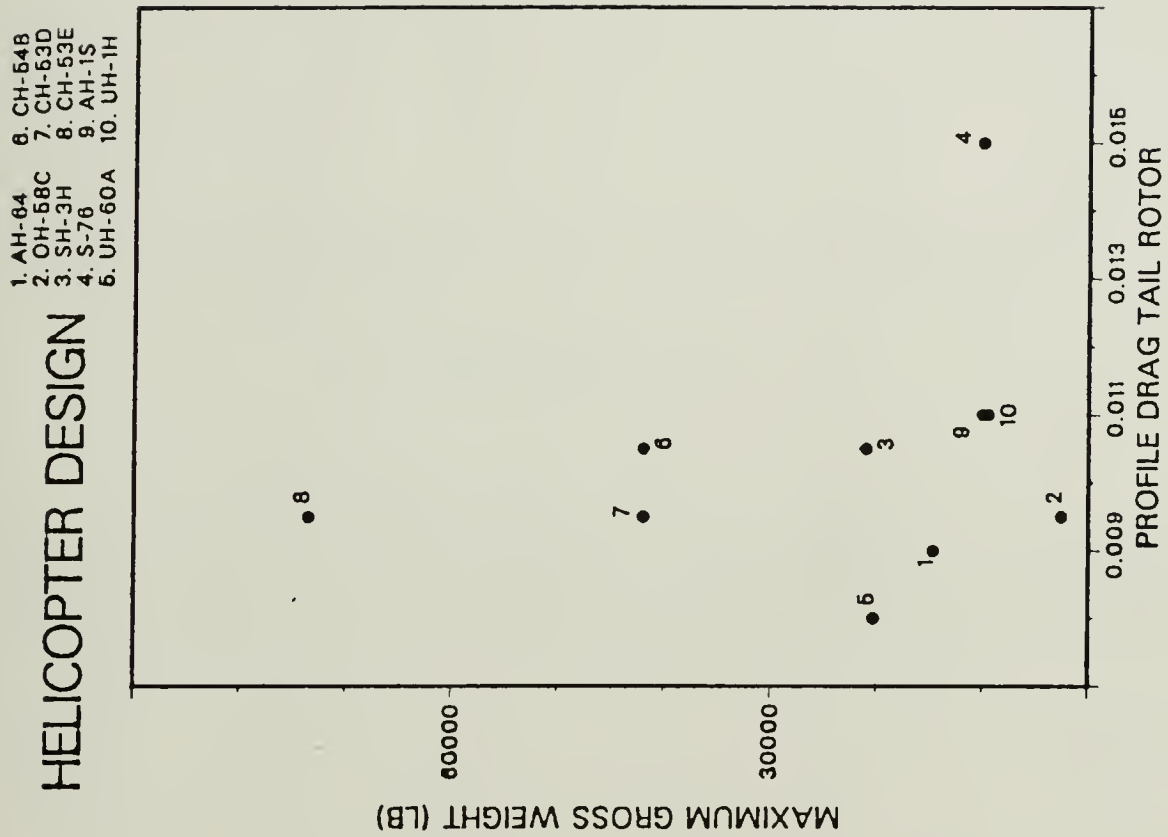


Fig. 15-30.

Fig. 15-30.

Disc Loading of the Main Rotor System Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

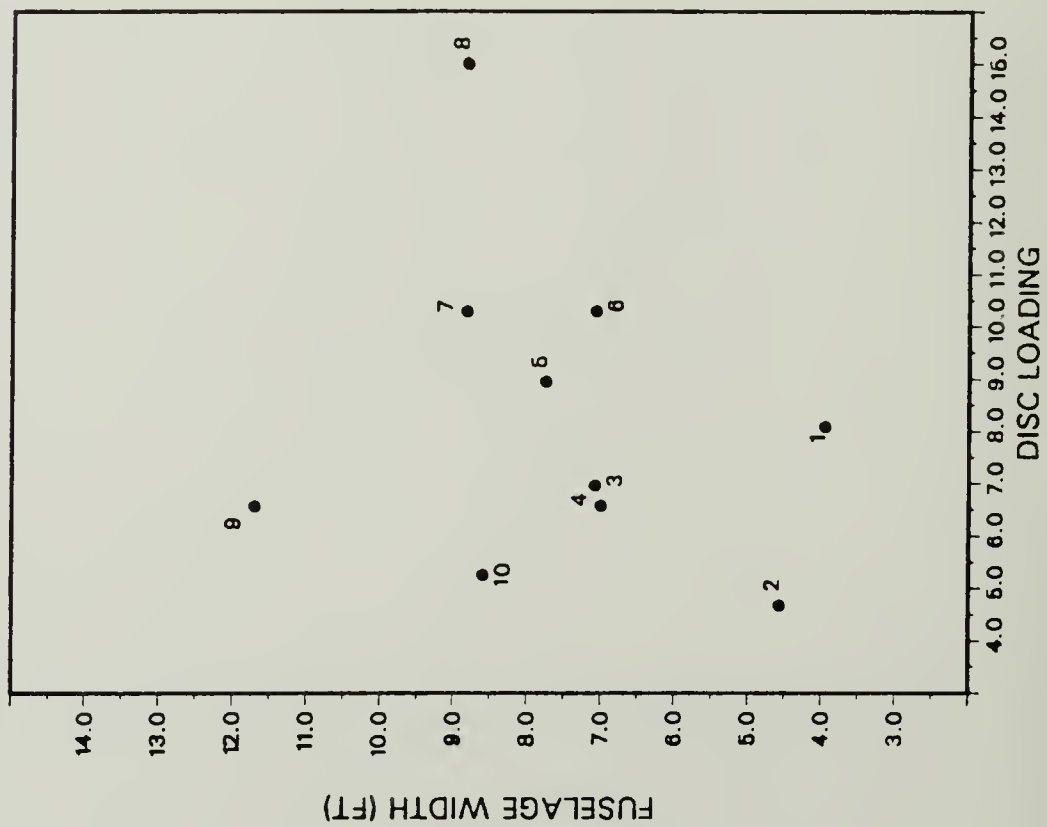


Fig. 16-17.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

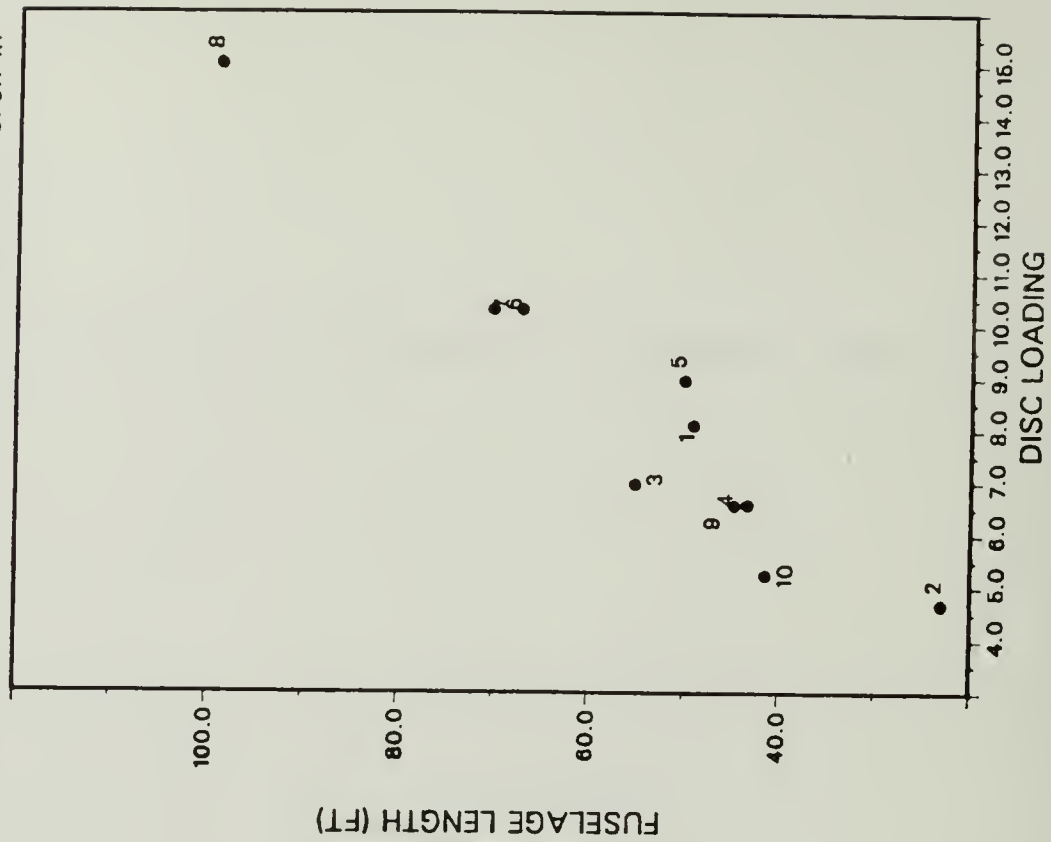


Fig. 16-18.

Fig. 16-17 and 16-18.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

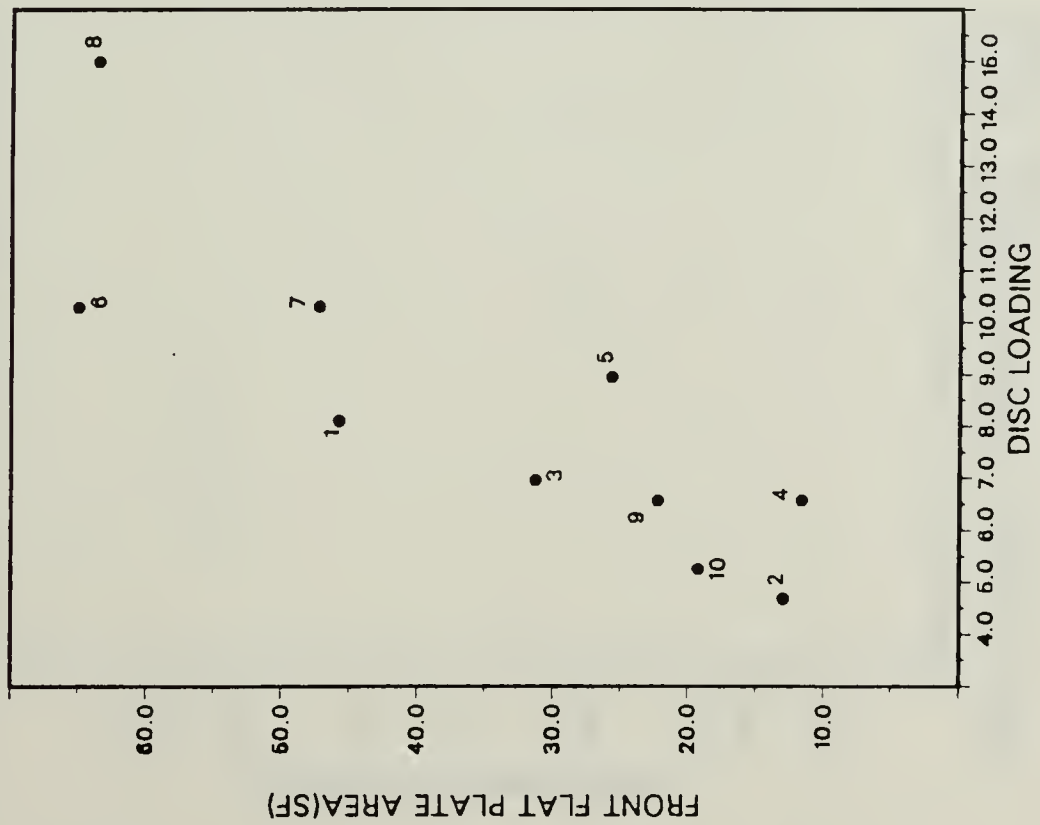


Fig. 16-19a.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

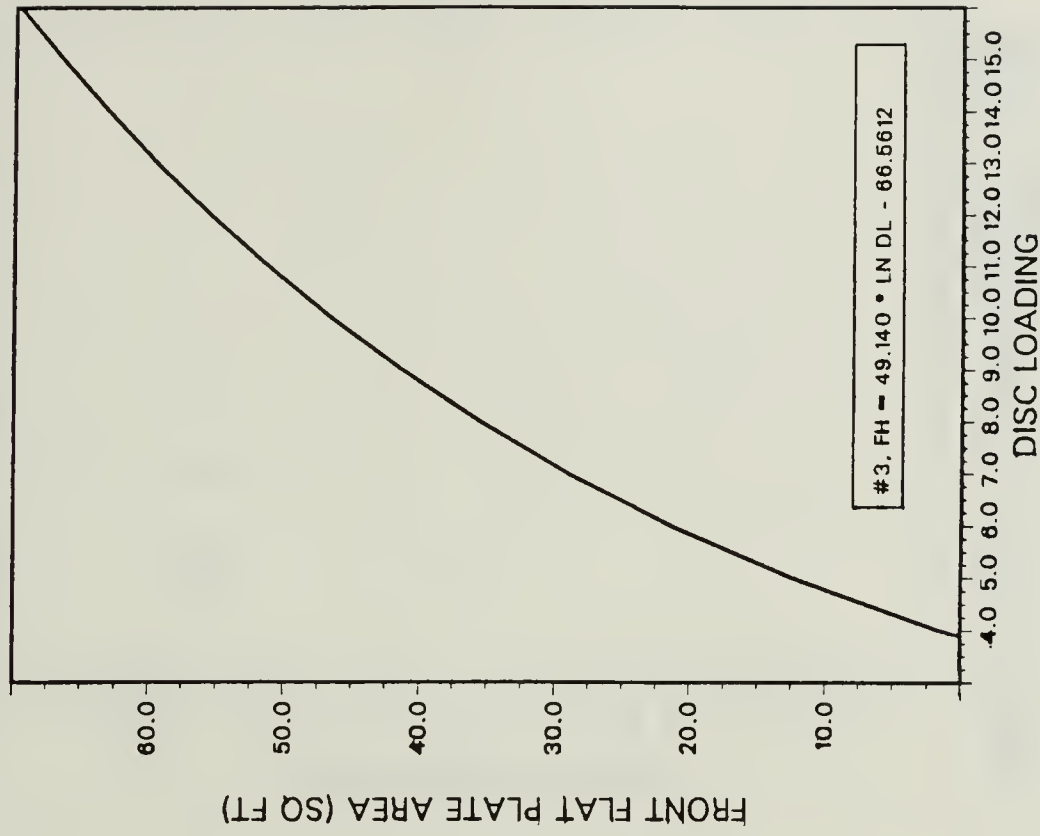


Fig. 16-19b.

Fig. 16-19a and 16-19b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

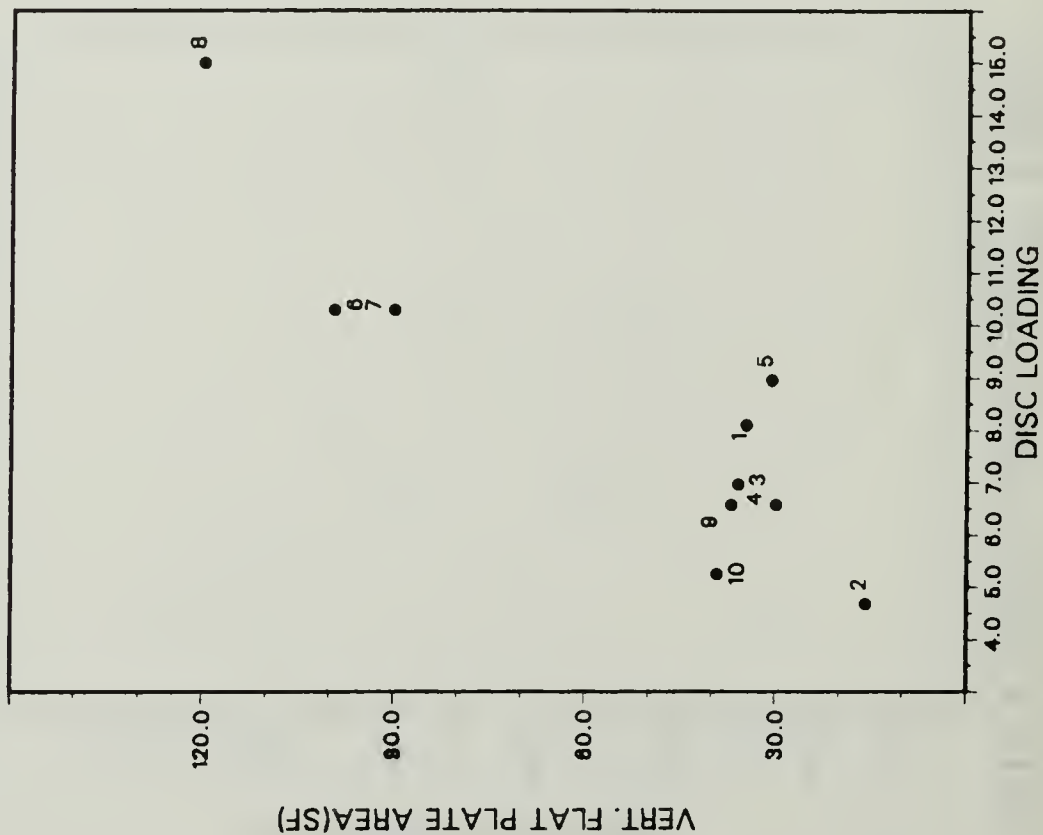


Fig. 16-20.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

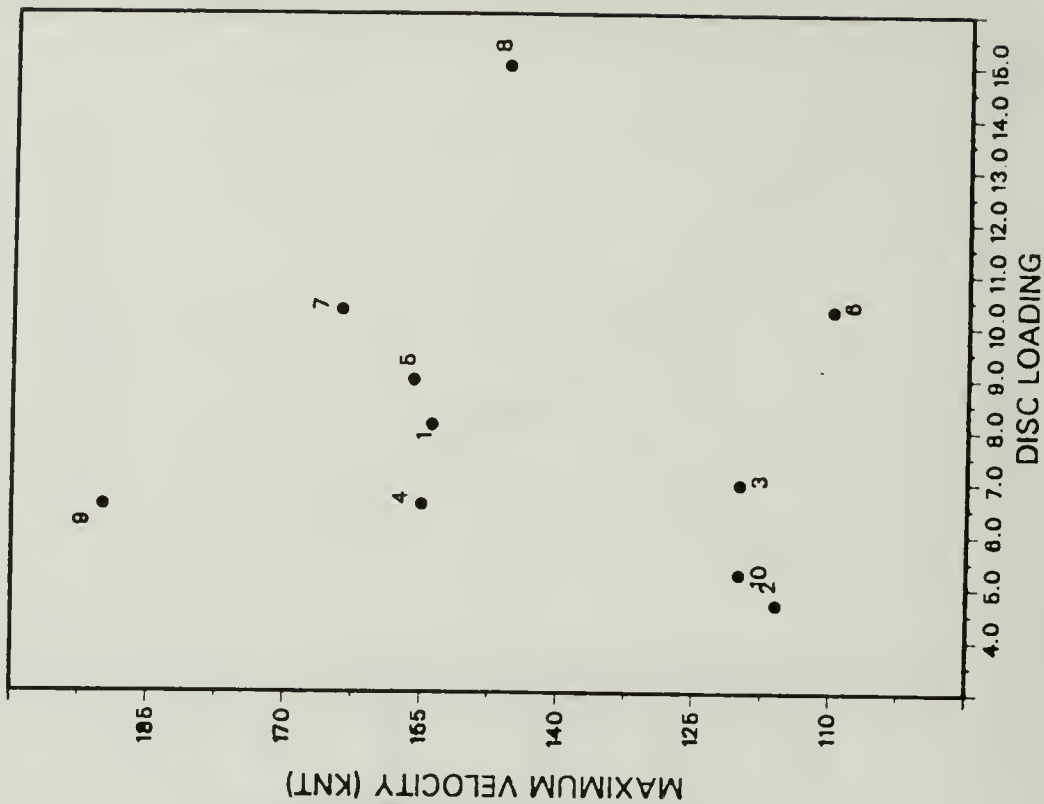


Fig. 16-21.

Fig. 16-20 and 16-21.

1. AH-84
2. OH-58C
3. SH-3H
4. S-78
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

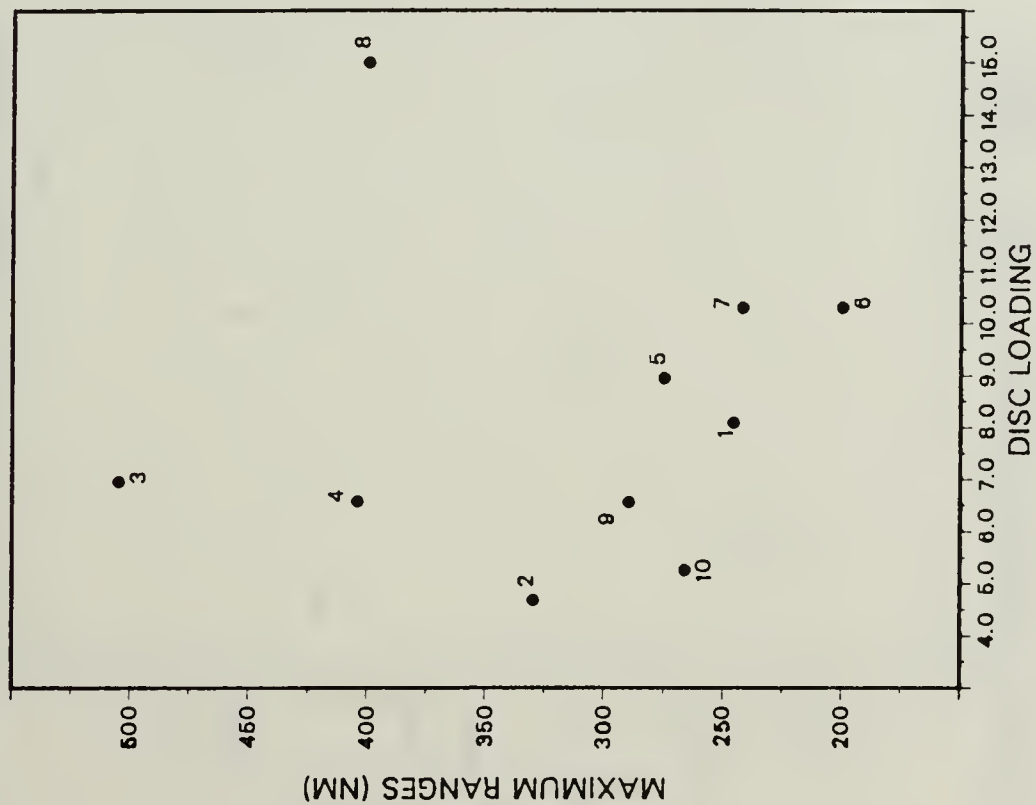


Fig. 16-22.

1. AH-84
2. OH-58C
3. SH-3H
4. S-78
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

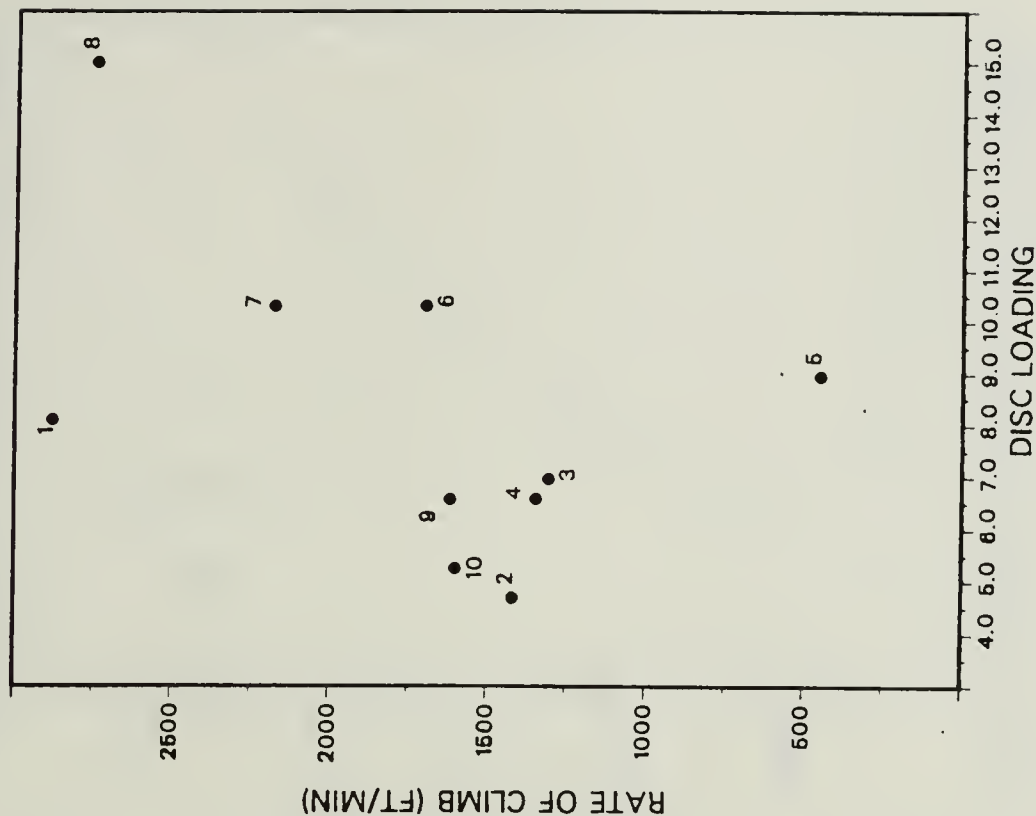


Fig. 16-23.

Fig. 16-22 and 16-23.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

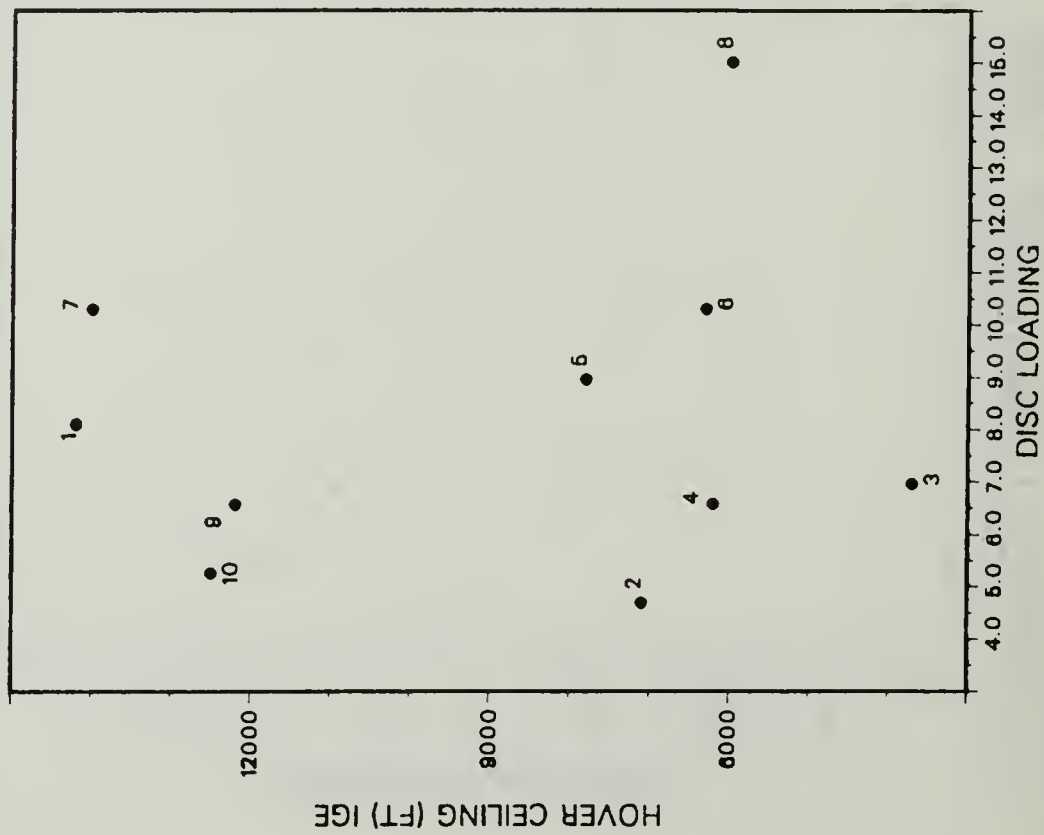


Fig. 16-24.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

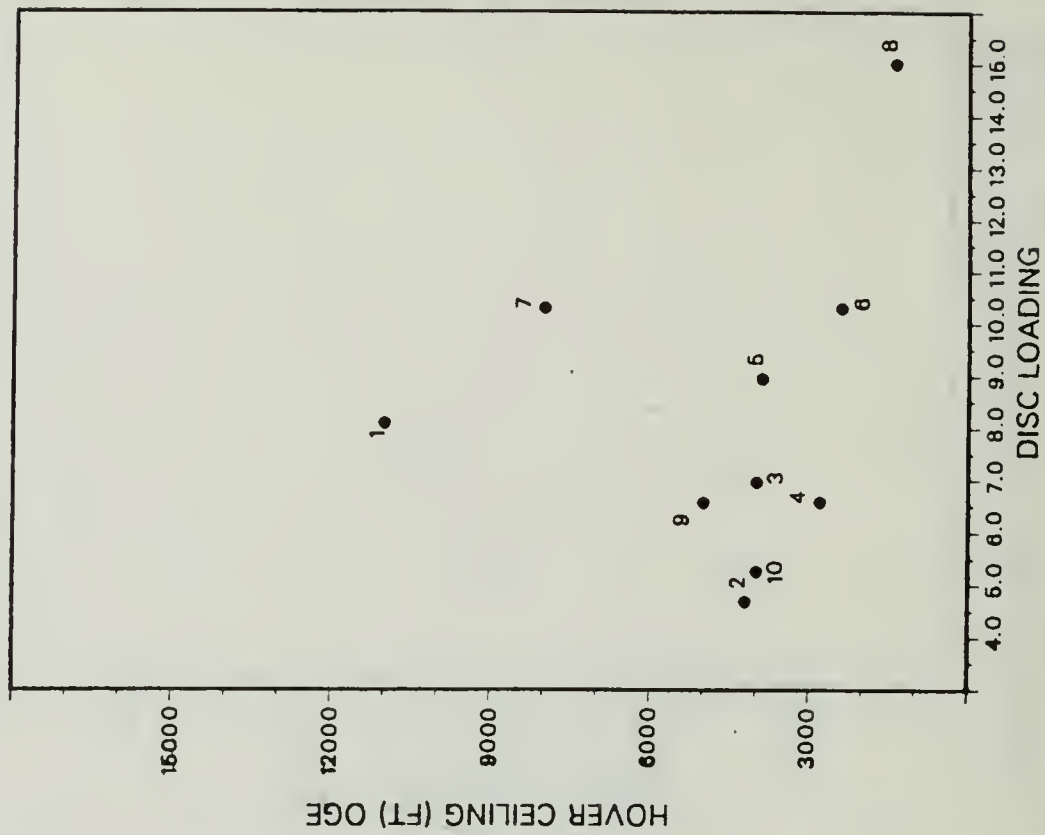


Fig. 16-25.

Fig. 16-24 and 16-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

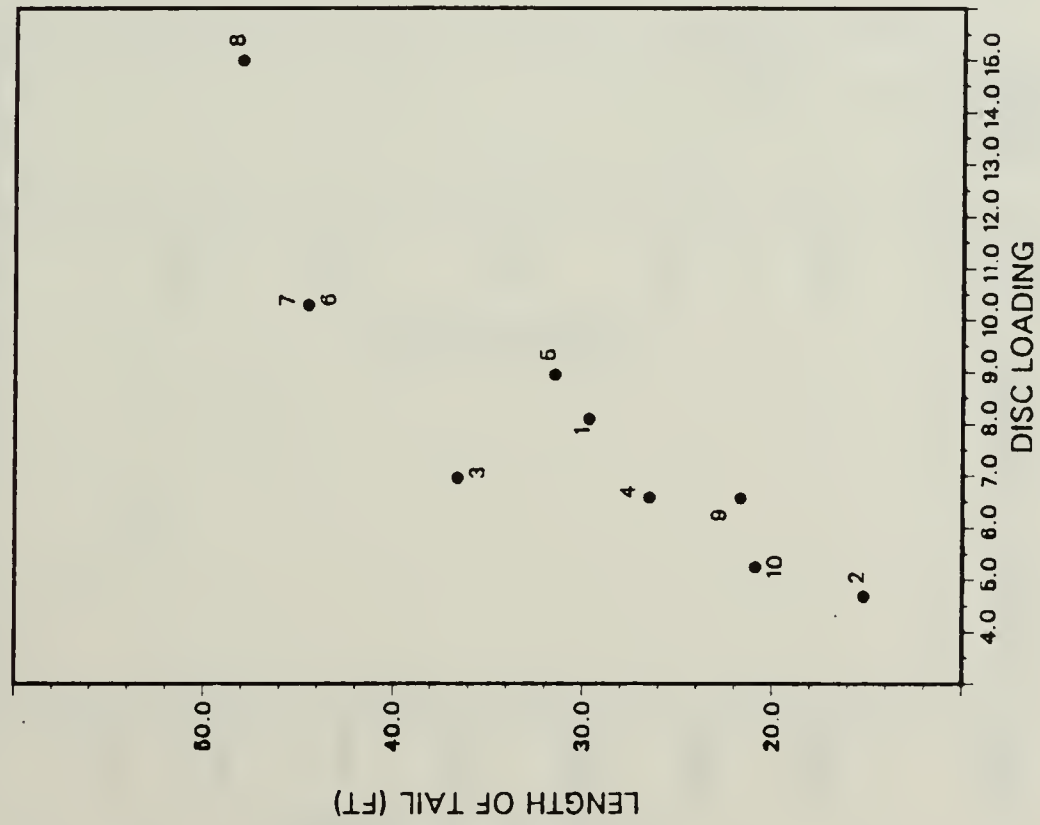


Fig. 16-26a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

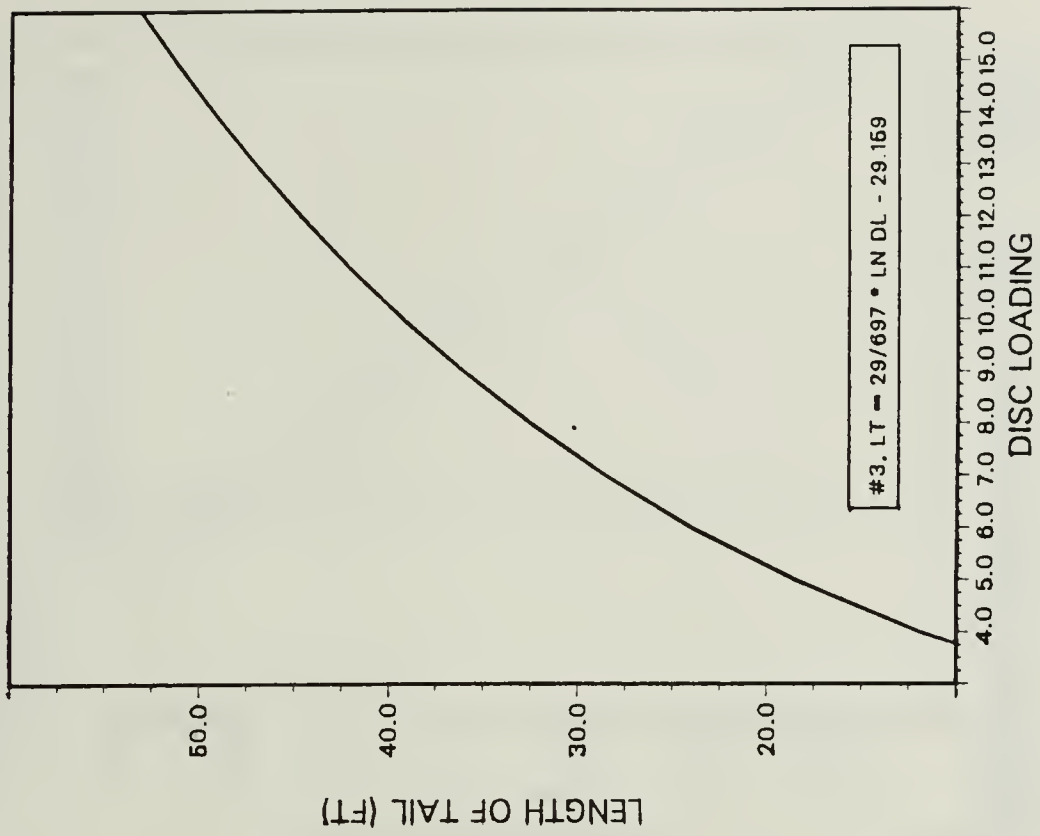


Fig. 16-26b.

Fig. 16-26a and 16-26b.

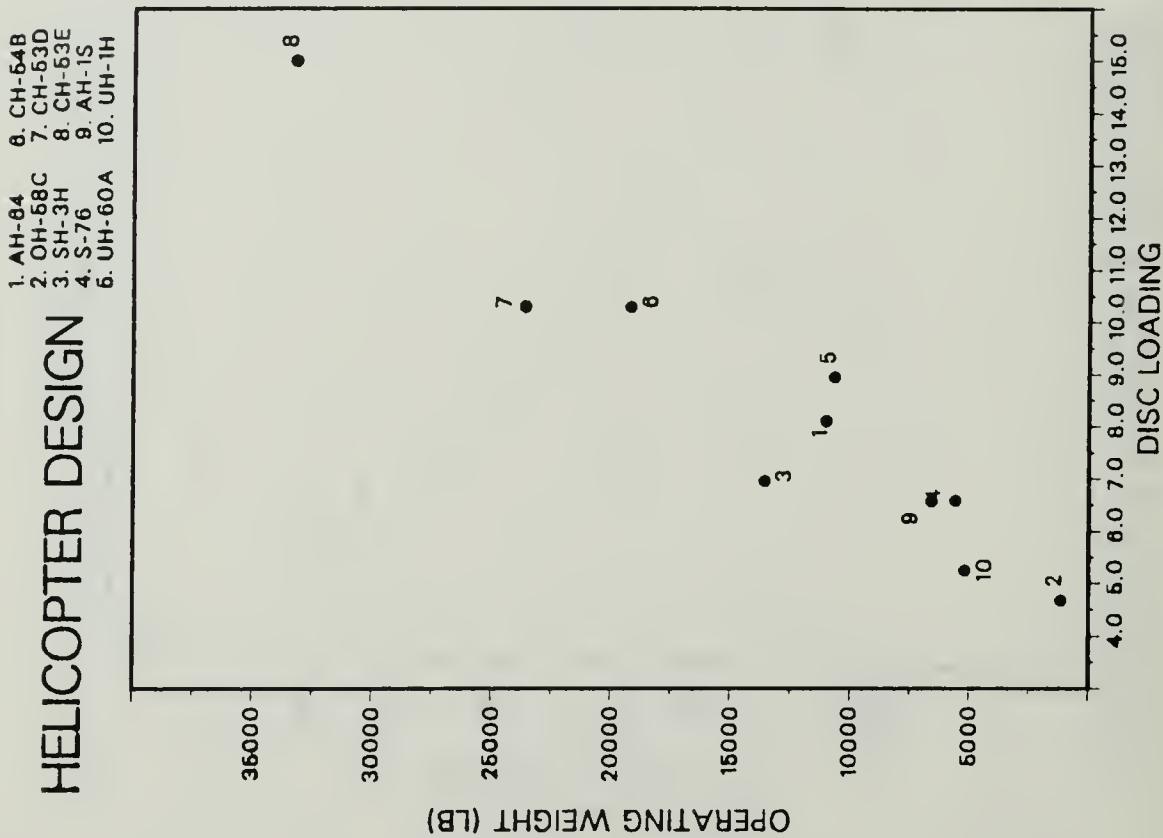


Fig. 16-27a.

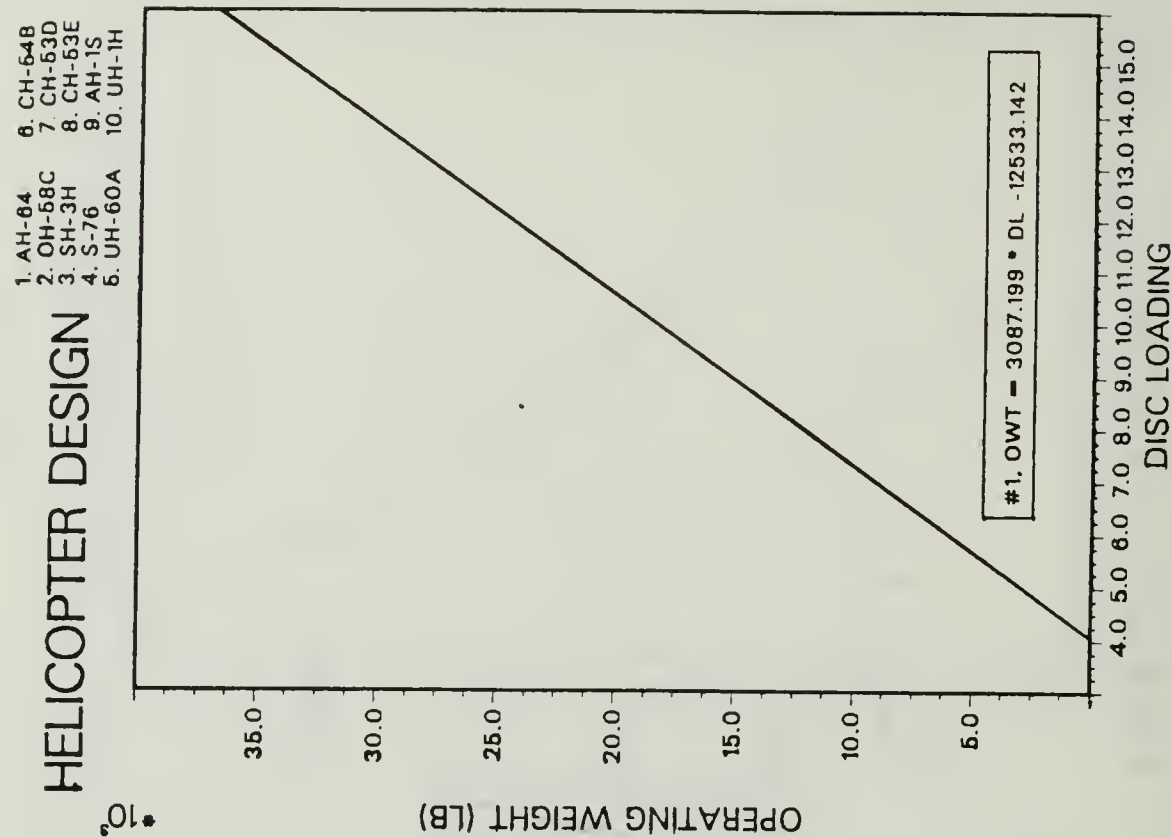


Fig. 16-27b.

Fig. 16-27a and 16-27b.

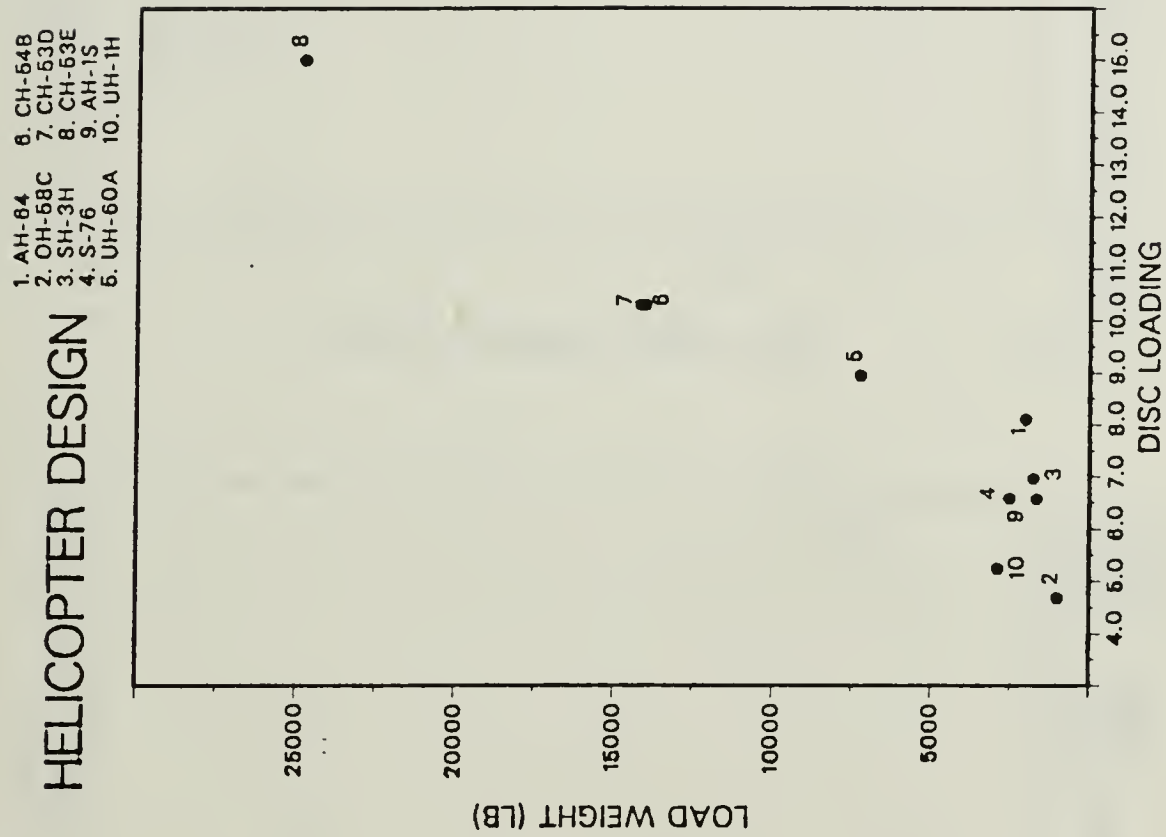


Fig. 16-28.

Fig. 16-28.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-548
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

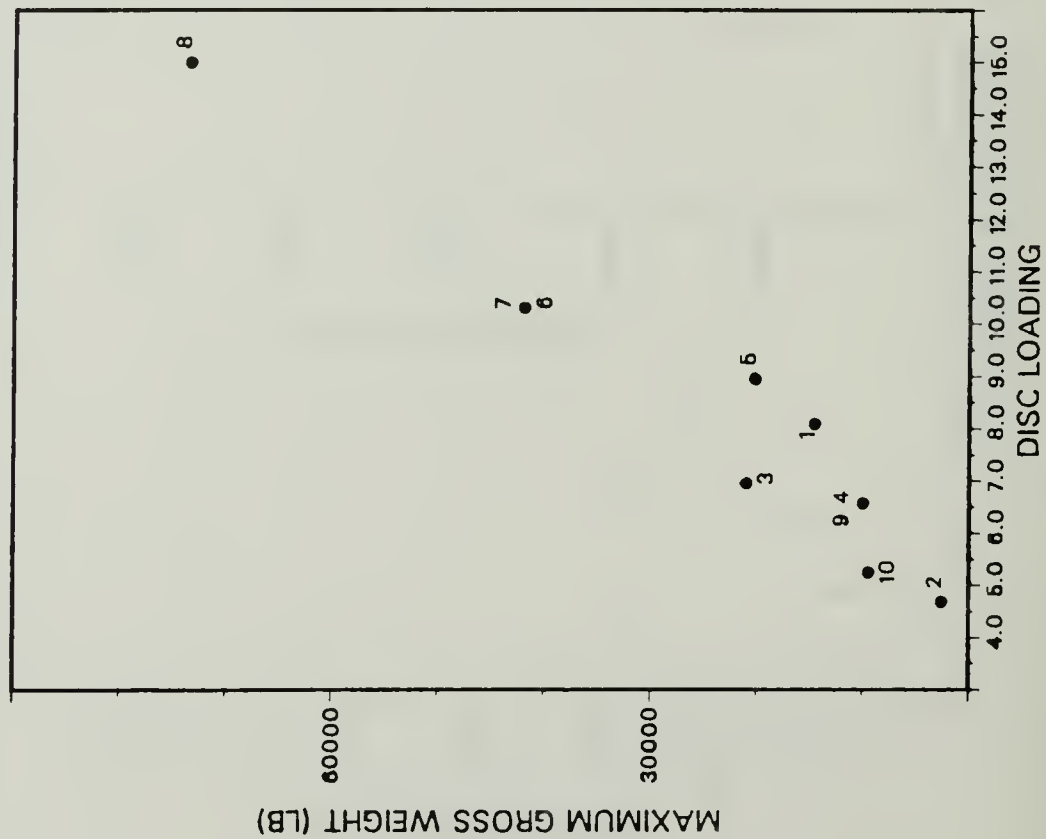


Fig. 16-30a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-548
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

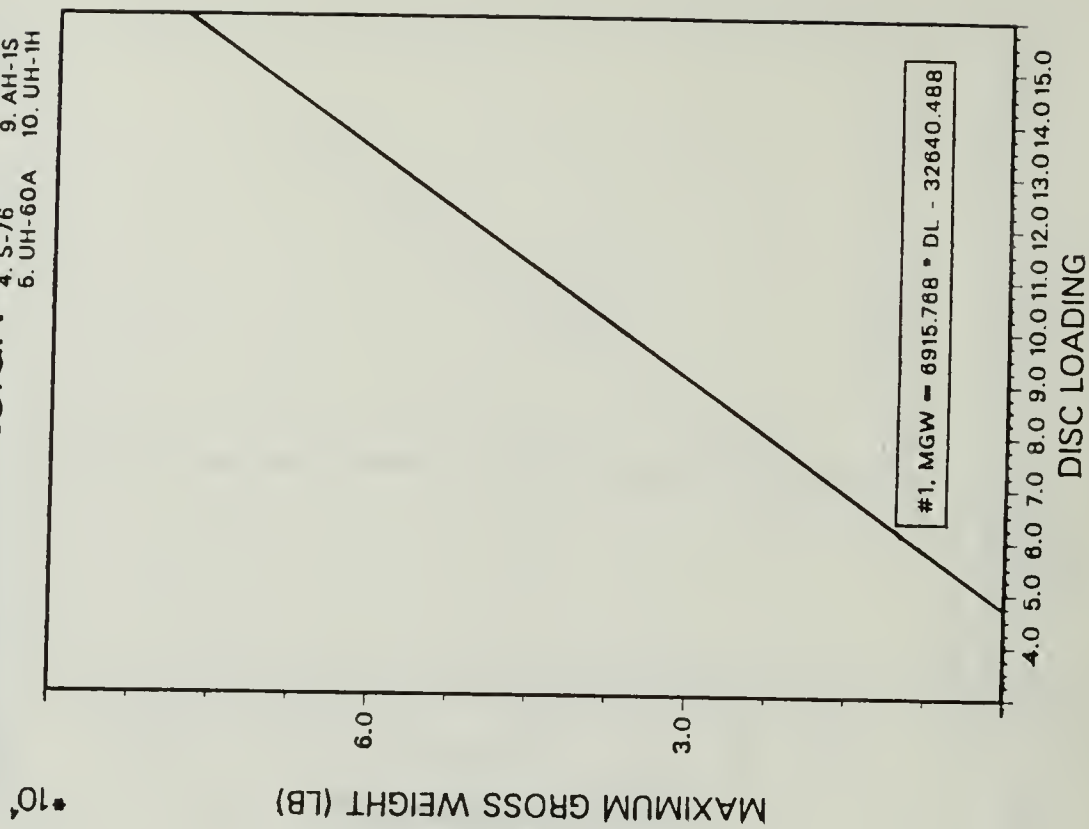


Fig. 16-30b.

Fig. 16-30a and 16-30b.

Width of the Fuselage Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

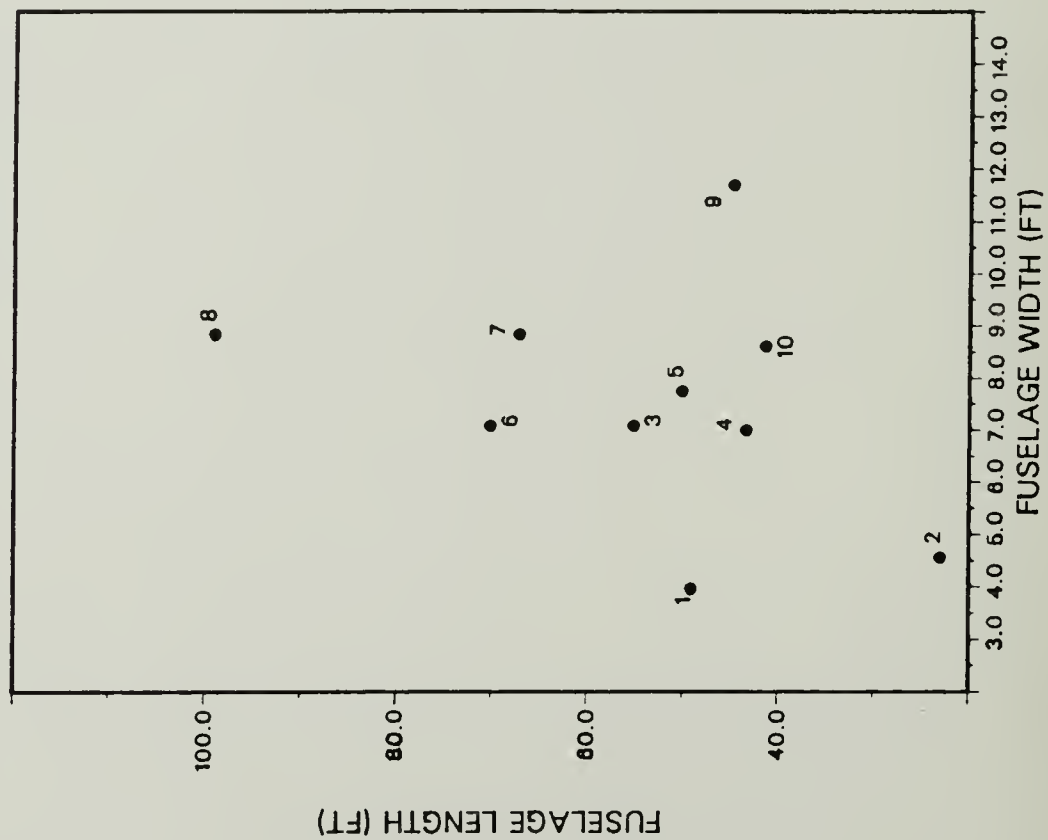


Fig. 17-18.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

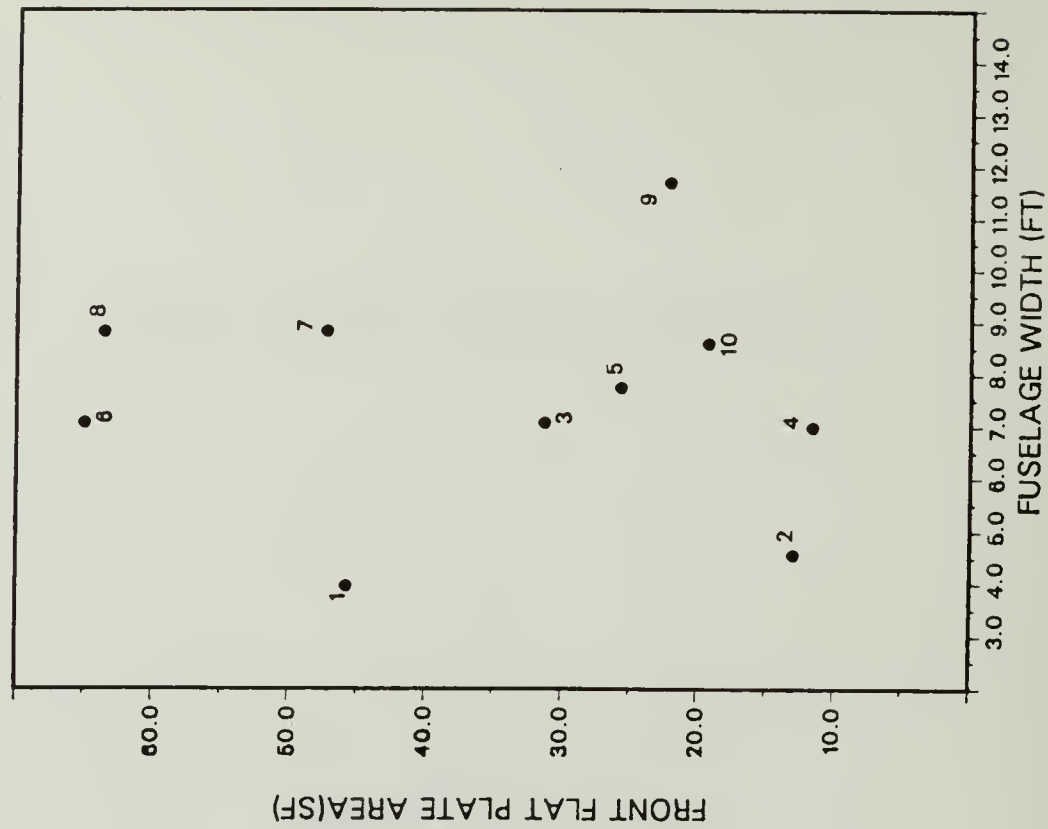


Fig. 17-19.

Fig. 17-18 and 17-19.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

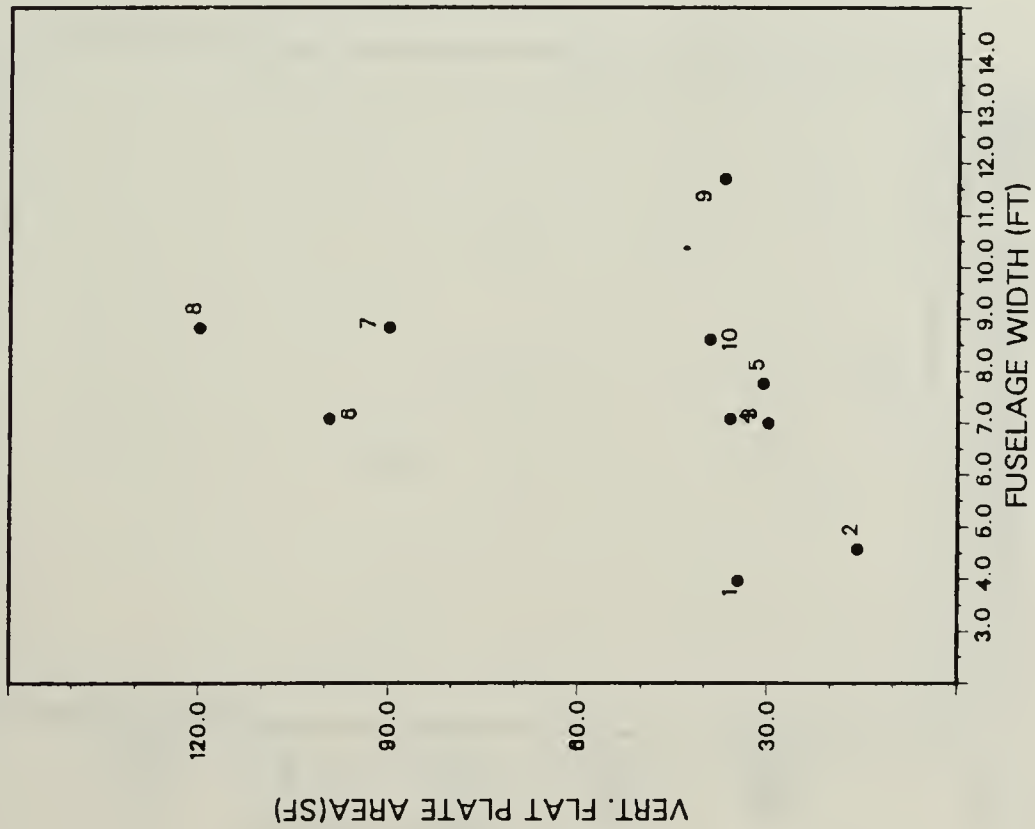


Fig. 17-20.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

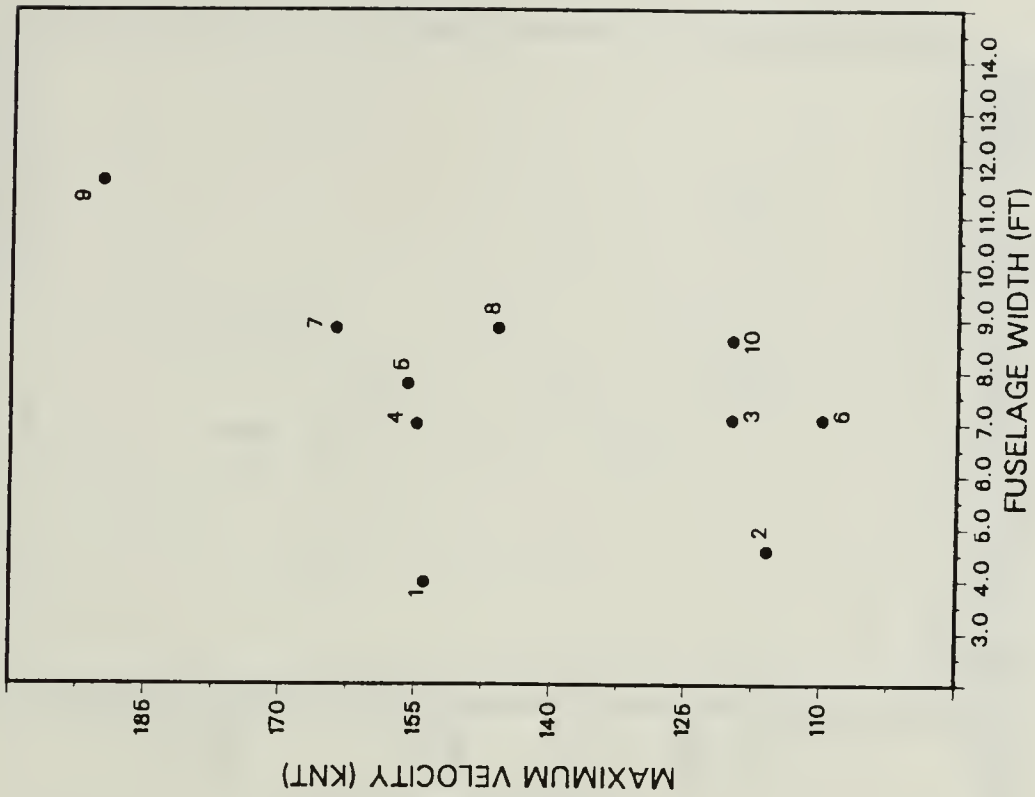


Fig. 17-21.

Fig. 17-20 and 17-21.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

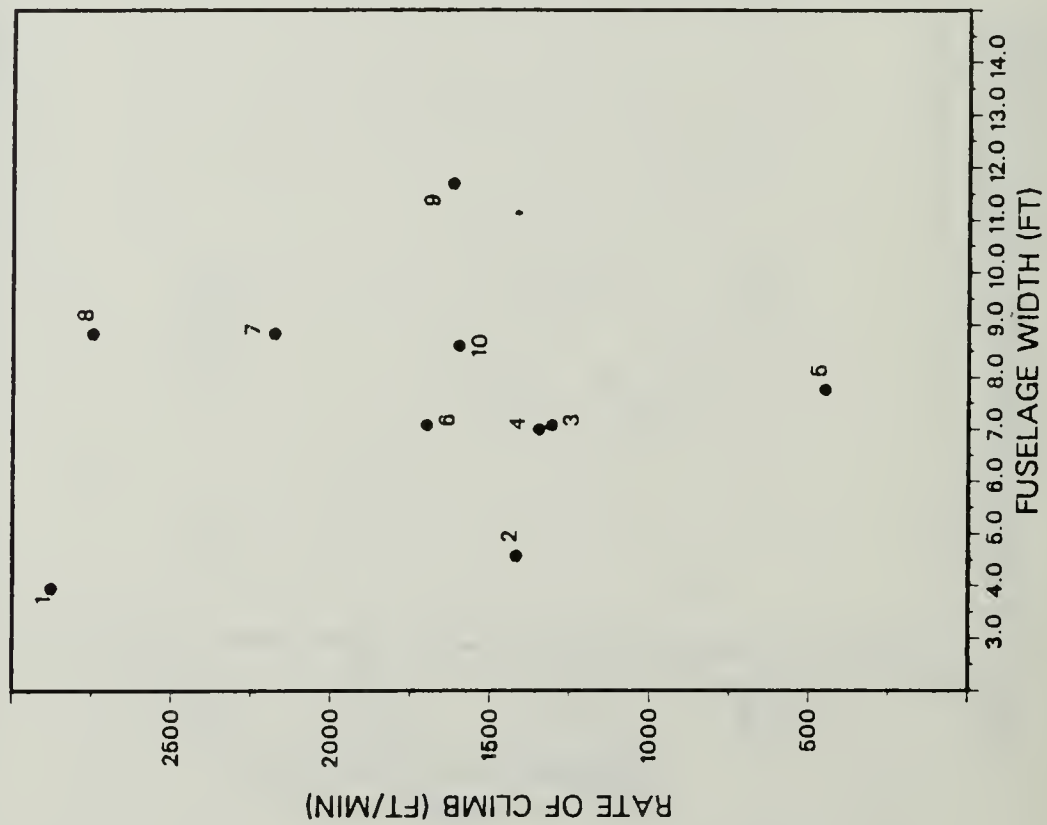


Fig. 17-23.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

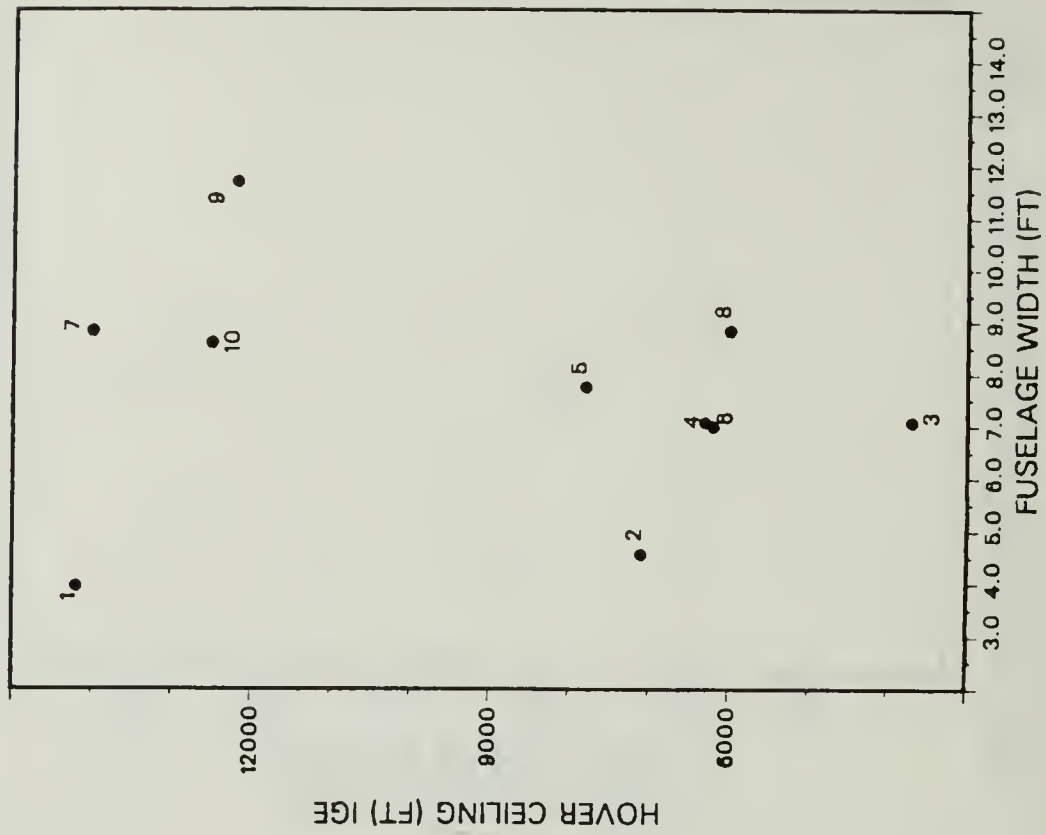


Fig. 17-24.

Fig. 17-23 and 17-24.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

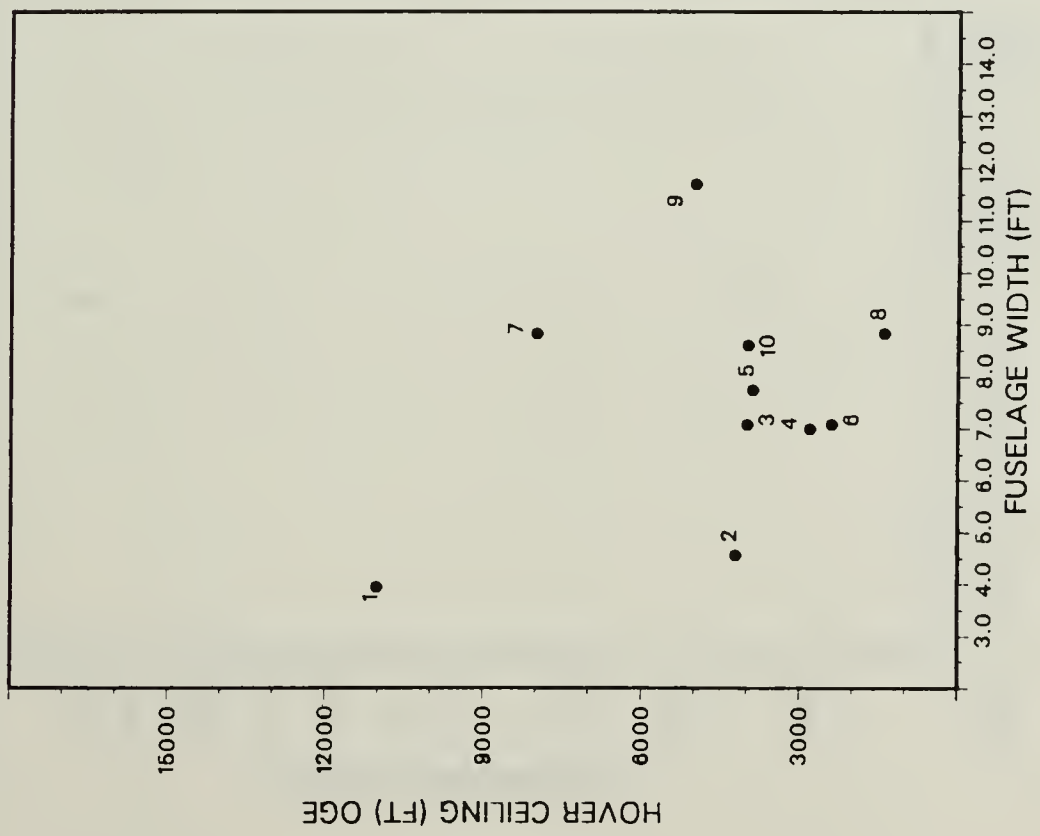


Fig. 17-25.

- 1. AH-64
- 2. OH-58C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

HELICOPTER DESIGN

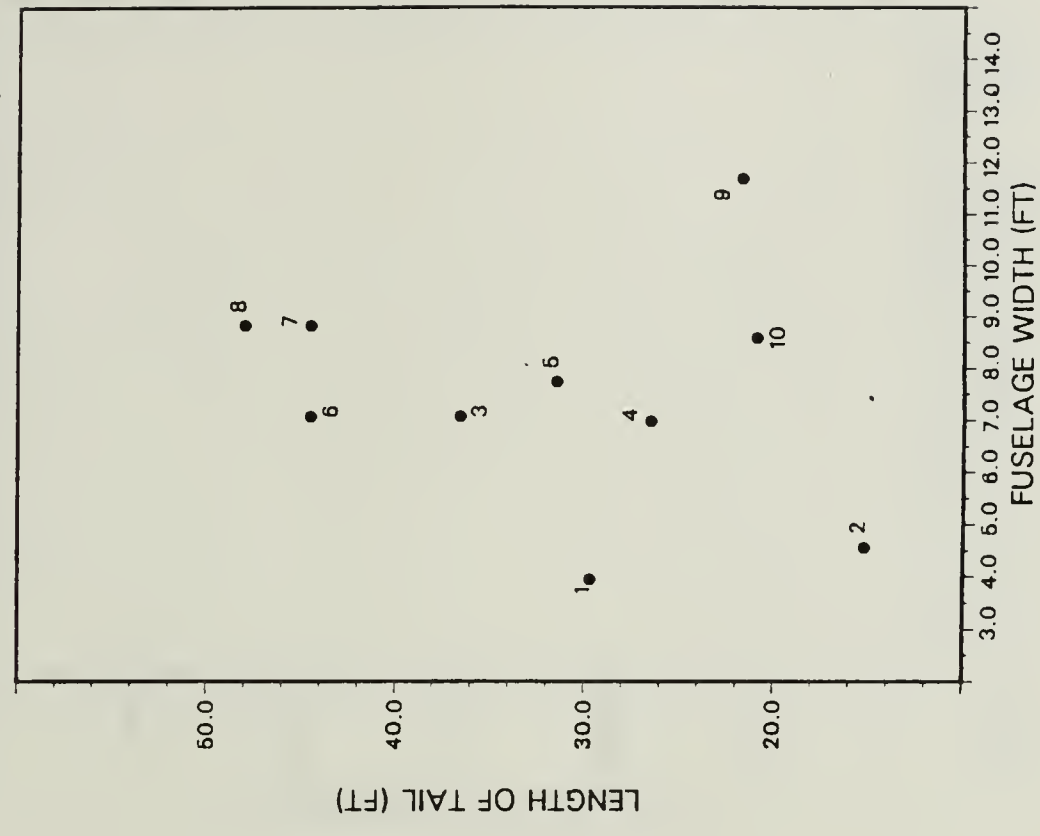


Fig. 17-26.

Fig. 17-25 and 17-26.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
8. CH-548
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

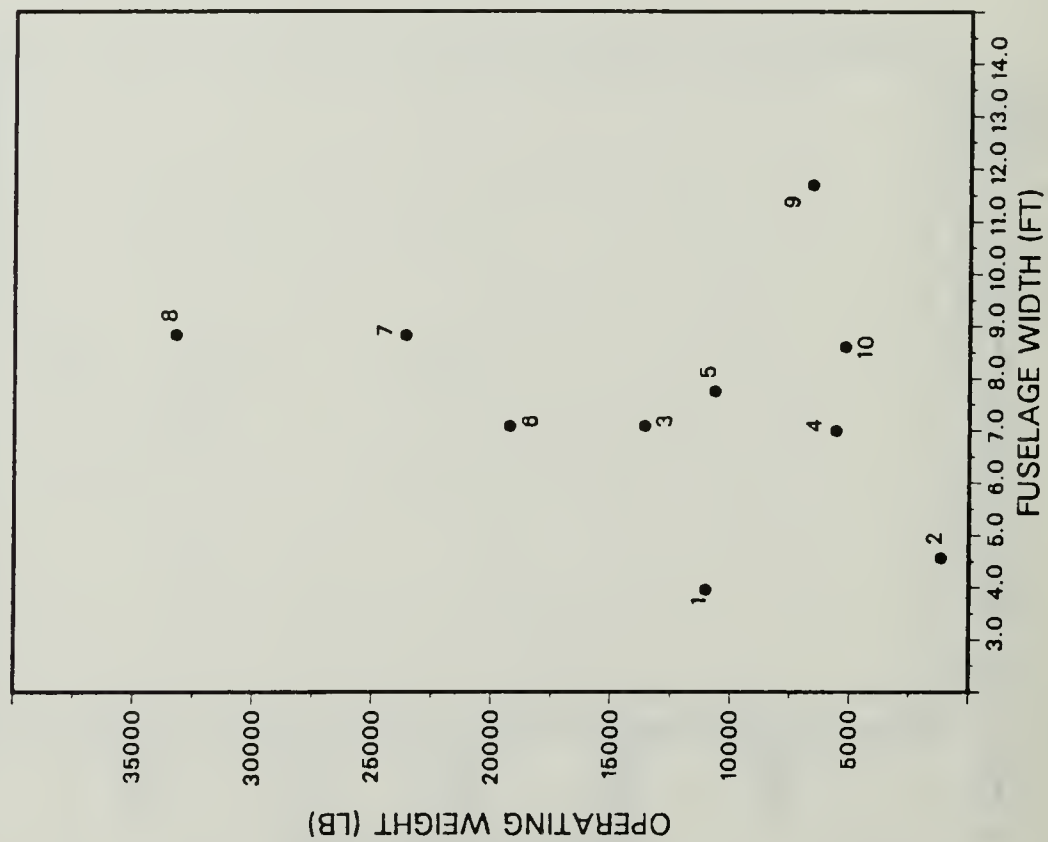


Fig. 17-27.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
8. CH-548
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

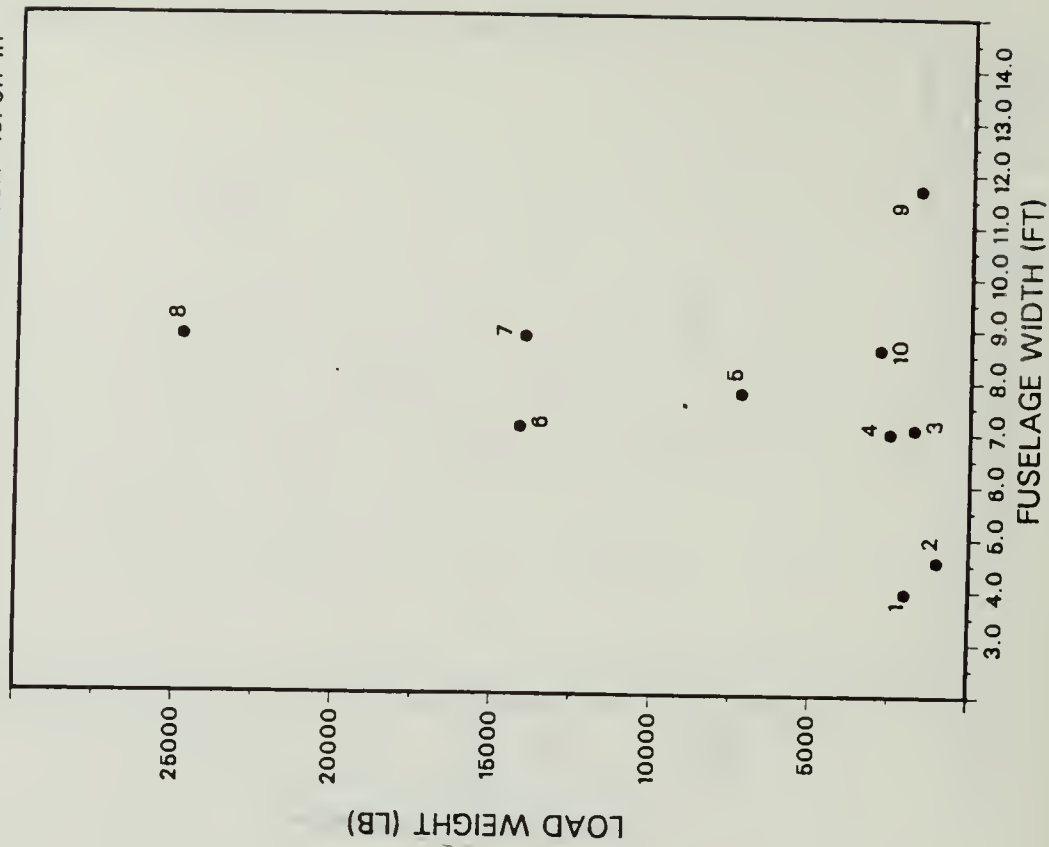


Fig. 17-28.

Fig. 17-27 and 17-28.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
6. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

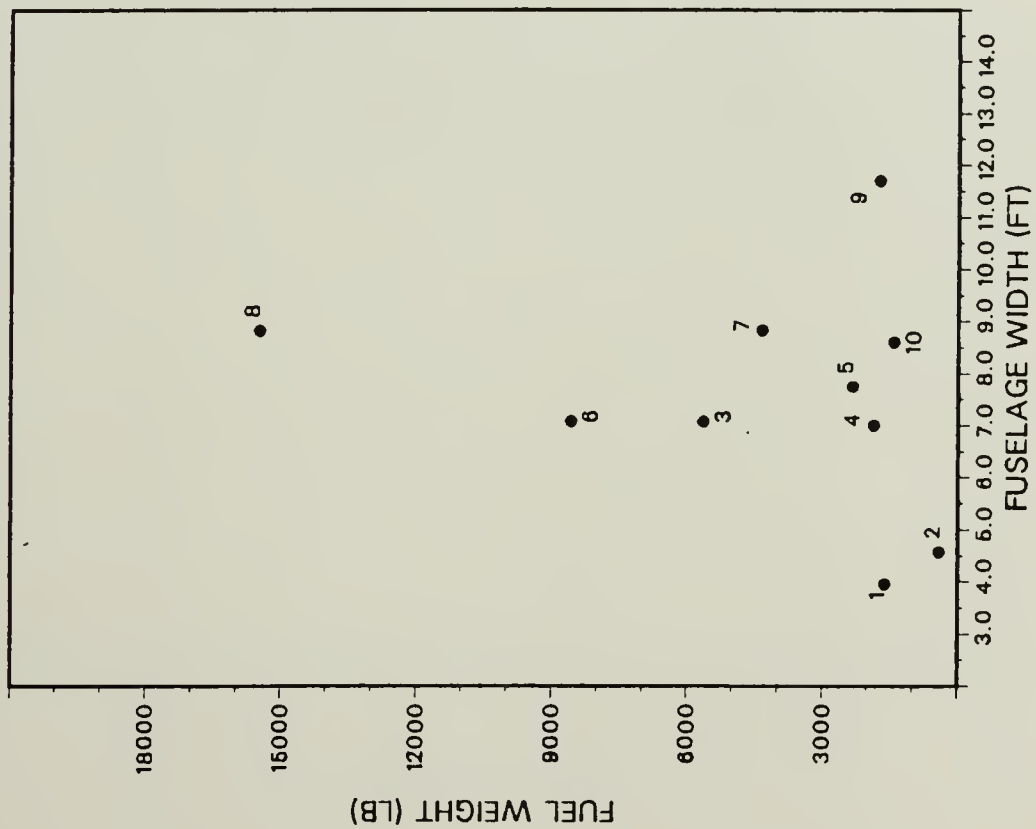


Fig. 17-29.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

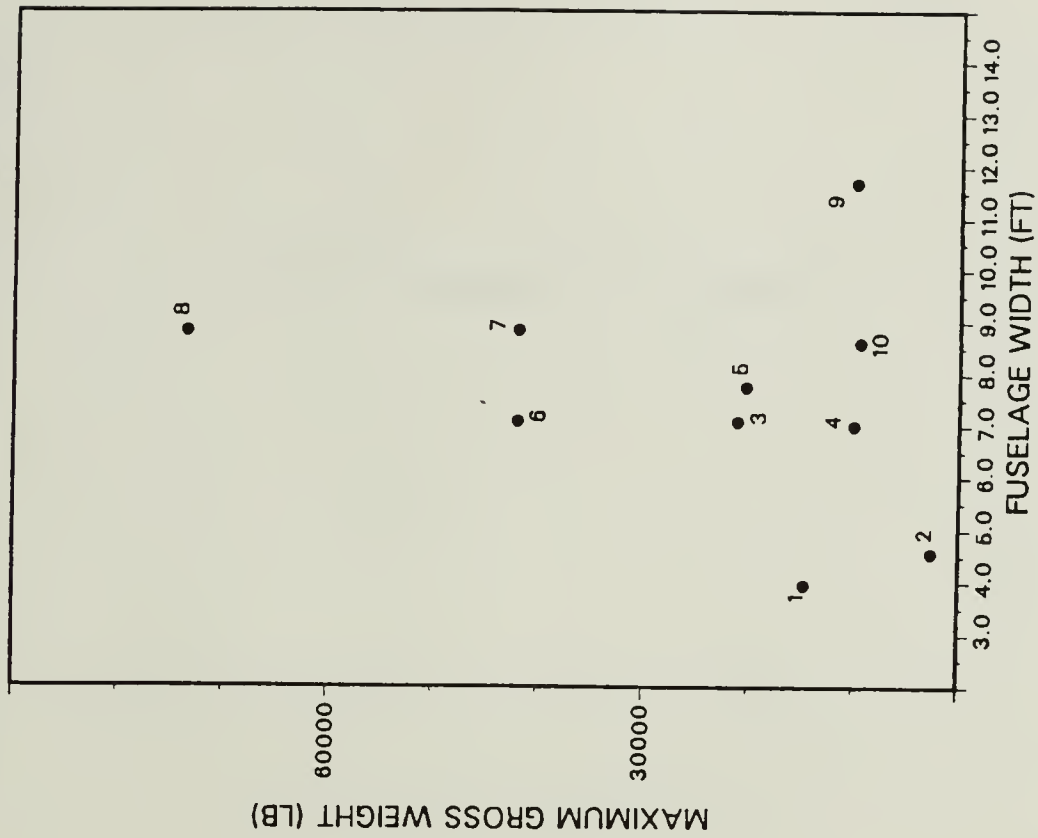


Fig. 17-30.

Fig. 17-29 and 17-30.

Length of Fuselage Pairings.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

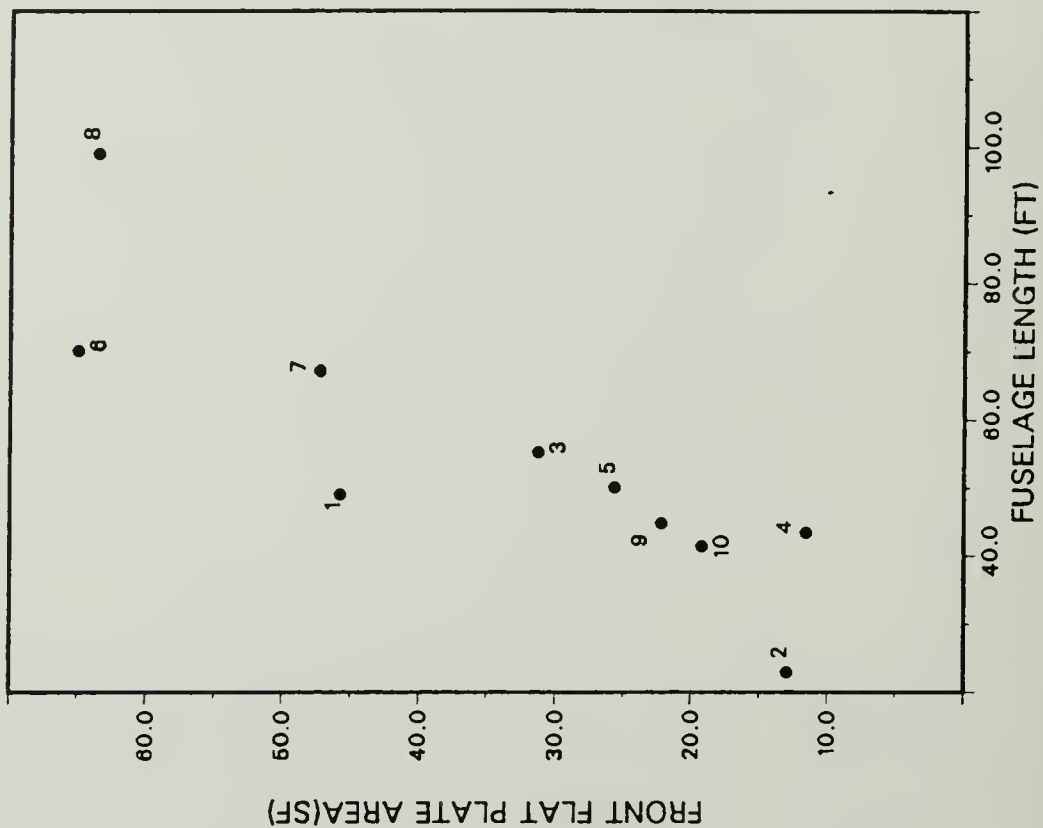


Fig. 18-19a.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

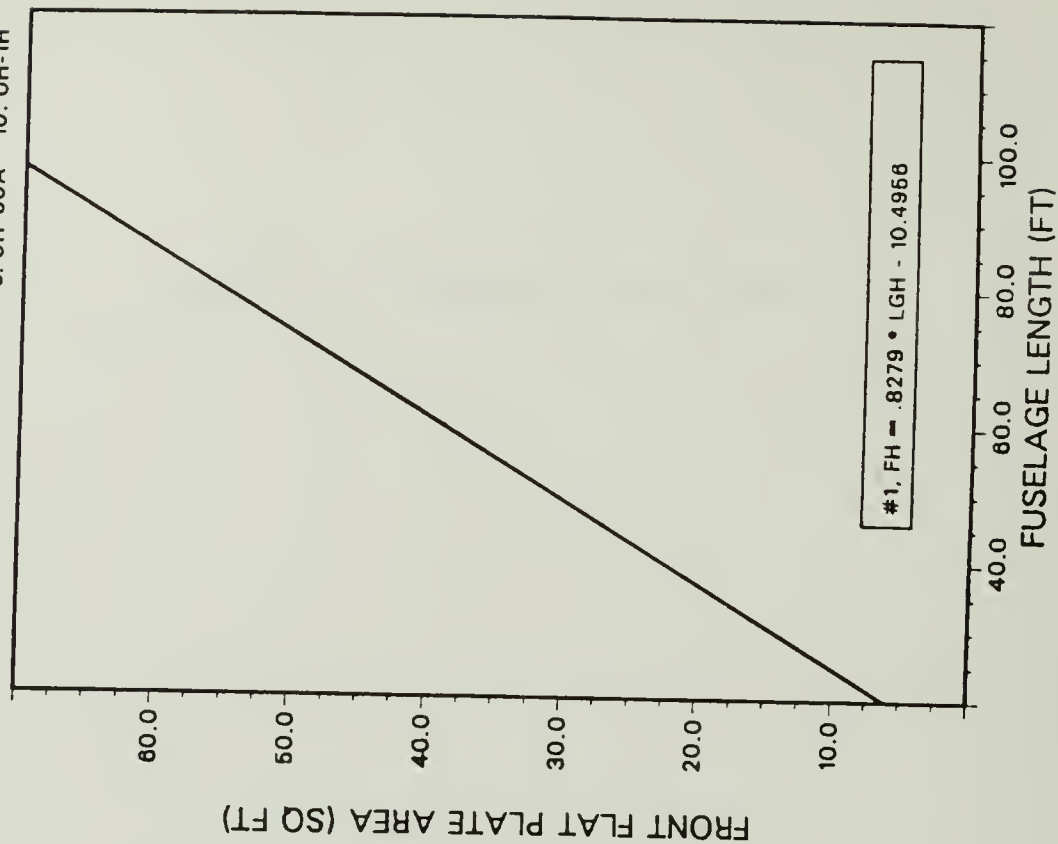


Fig. 18-19b.

Fig. 18-19a and 18-19b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

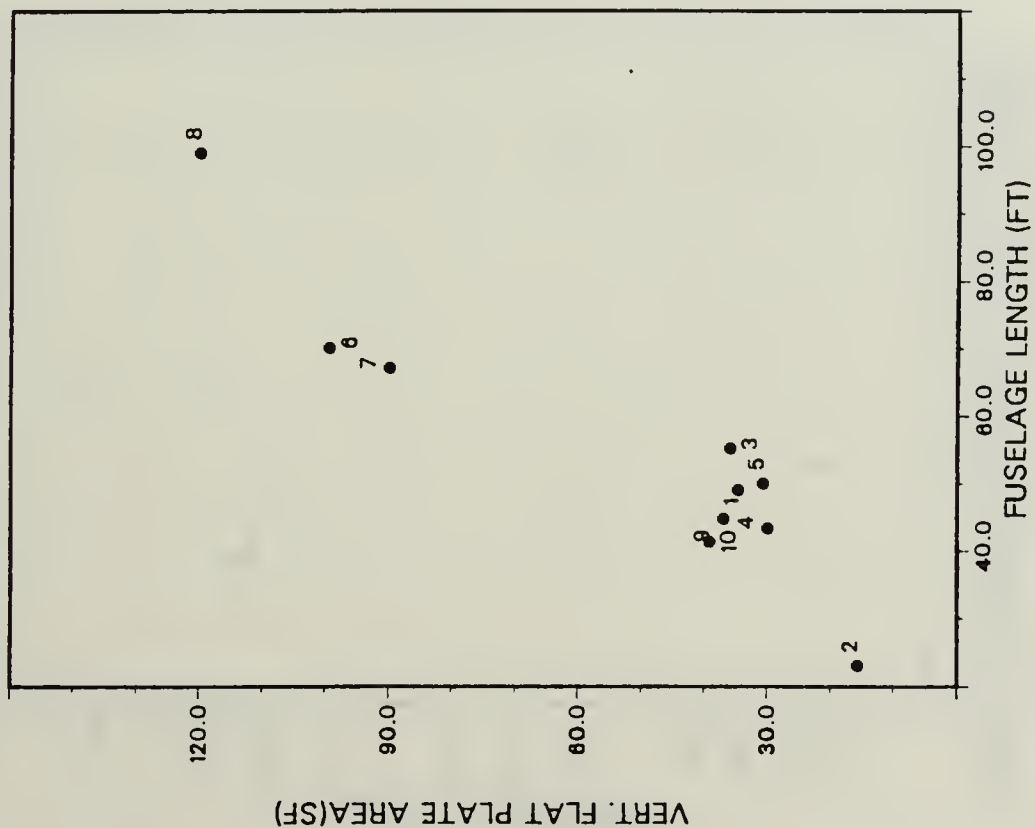


Fig. 18-20.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

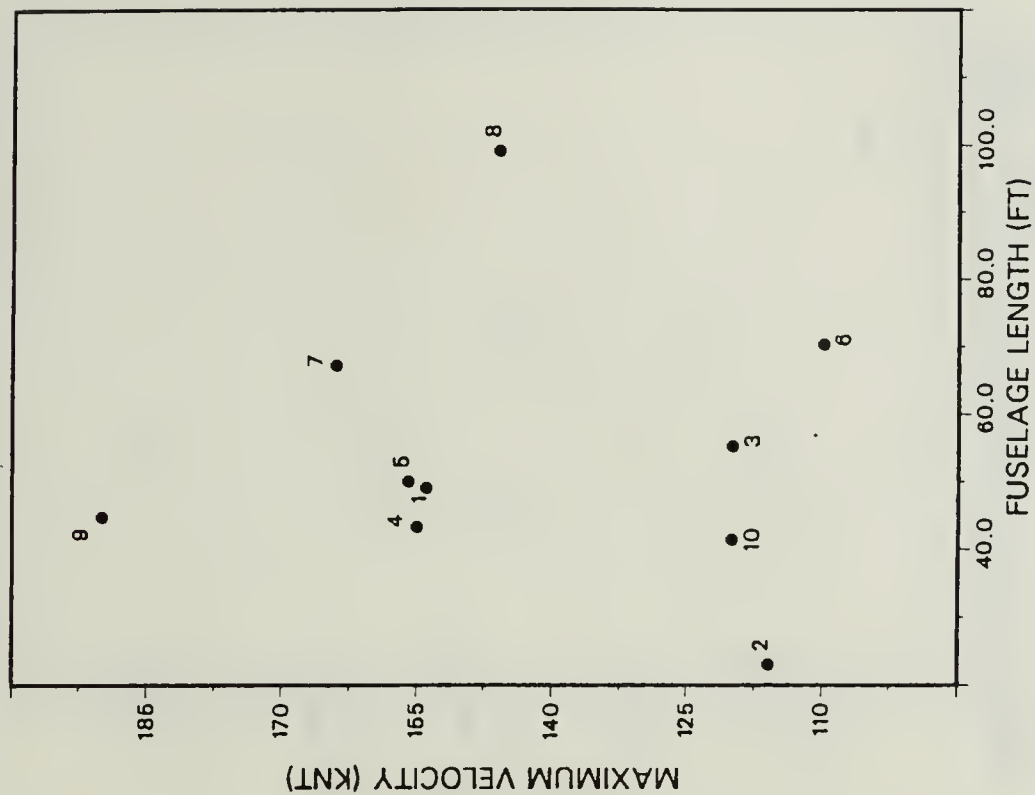


Fig. 18-21.

Fig. 18-20 and 18-21.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

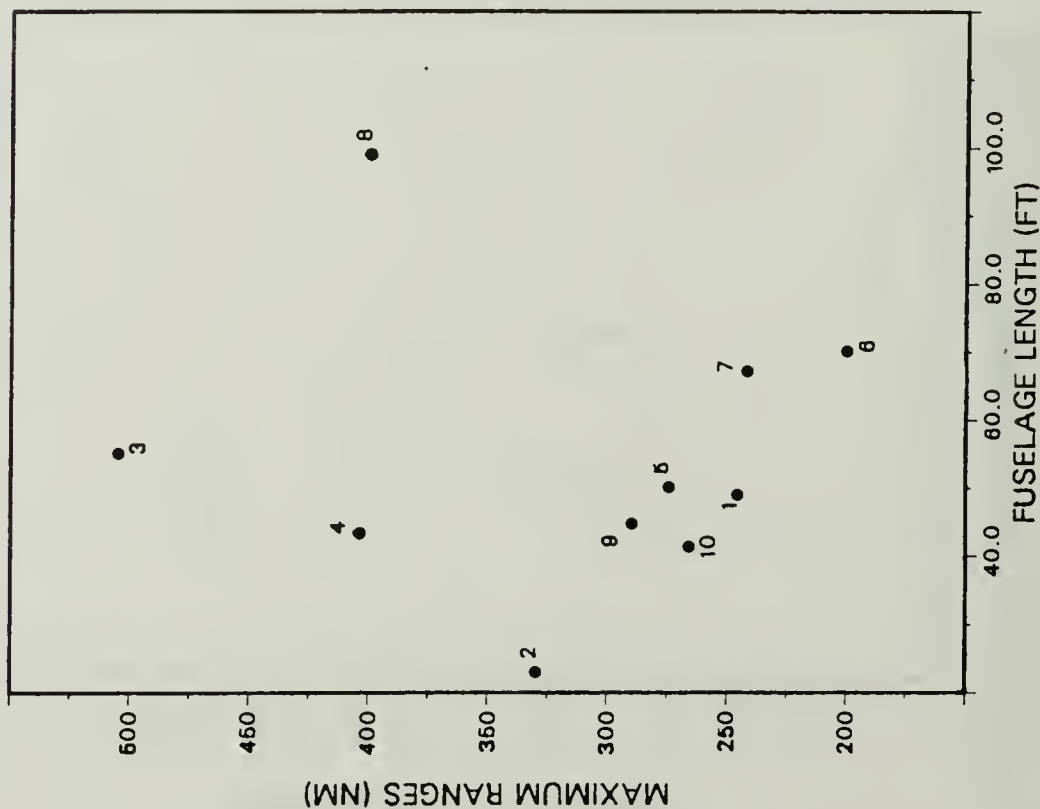


Fig. 18-22.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

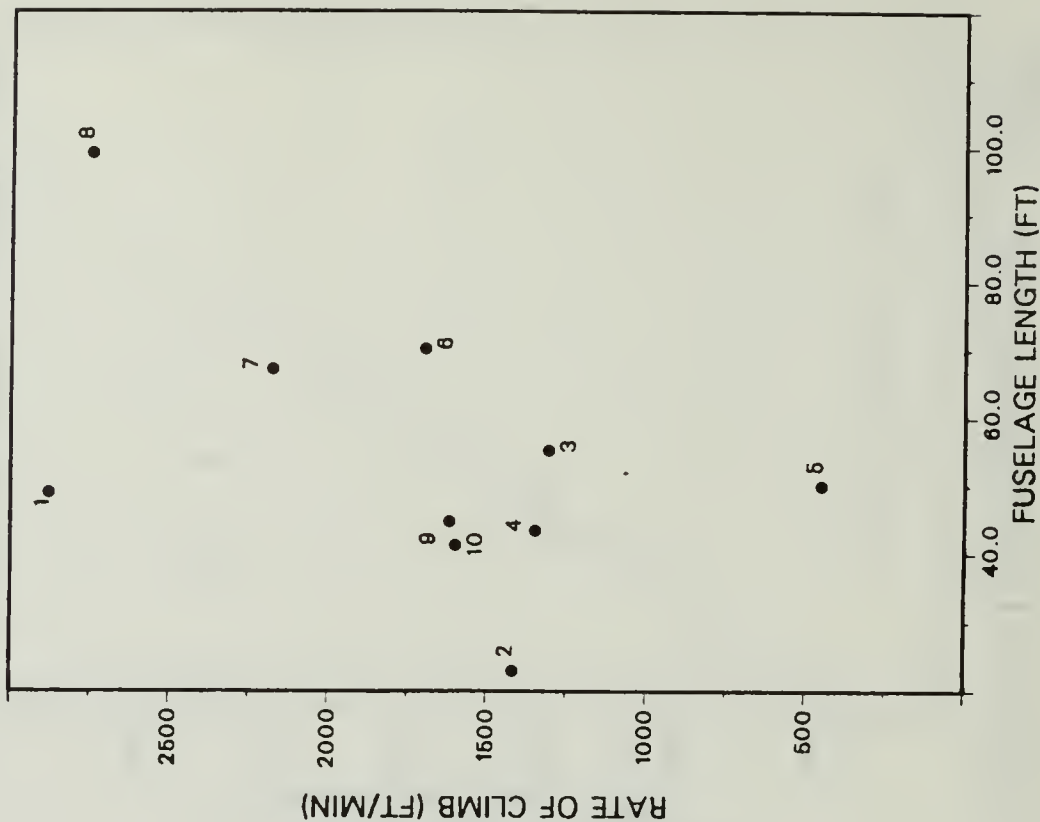


Fig. 18-23.

Fig. 18-22 and 18-23.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

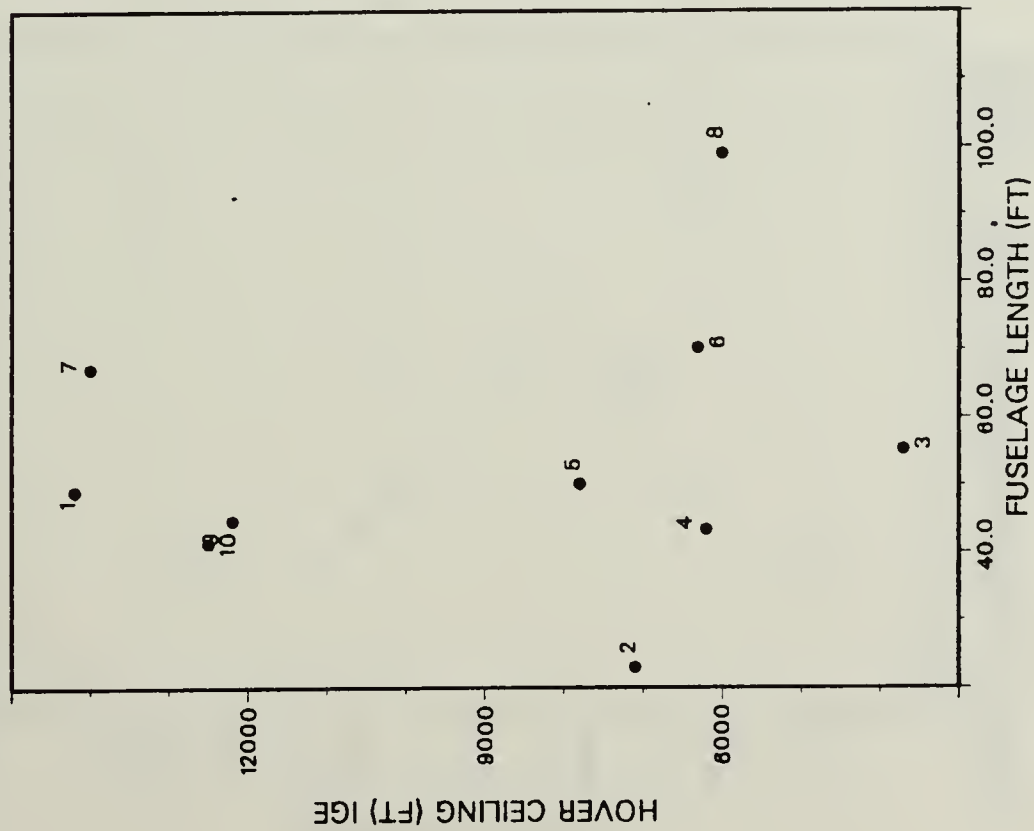


Fig. 18-24.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

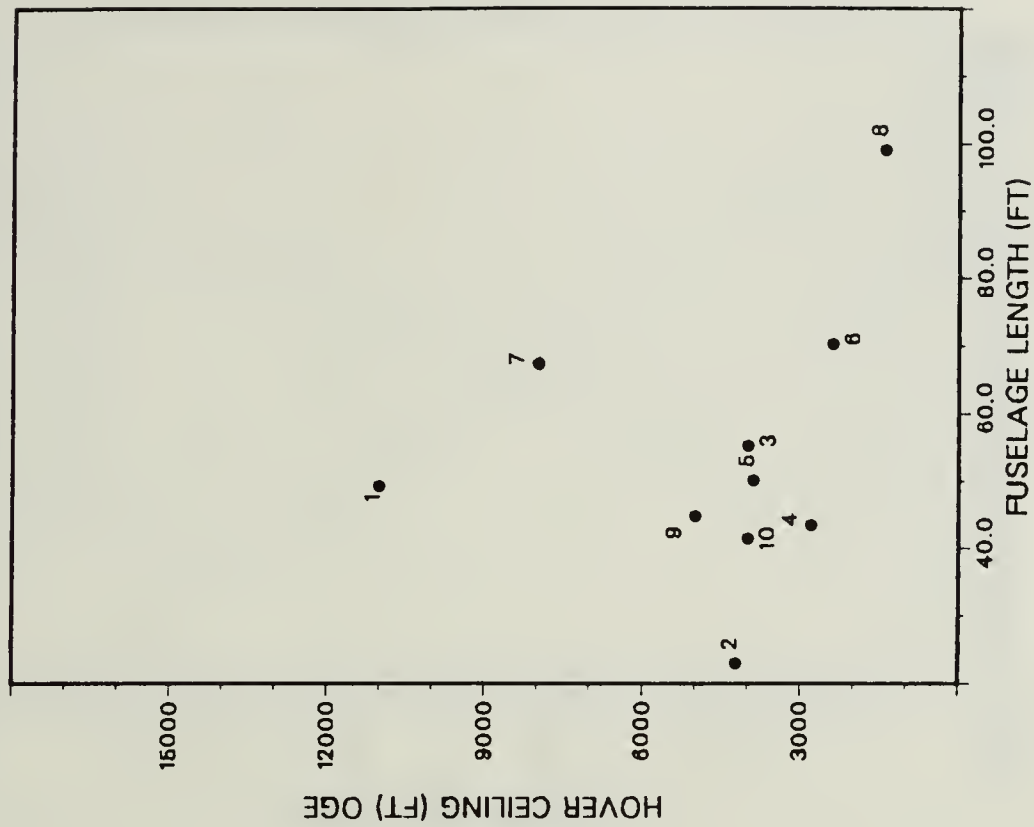


Fig. 18-25.

Fig. 18-24 and 18-25.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

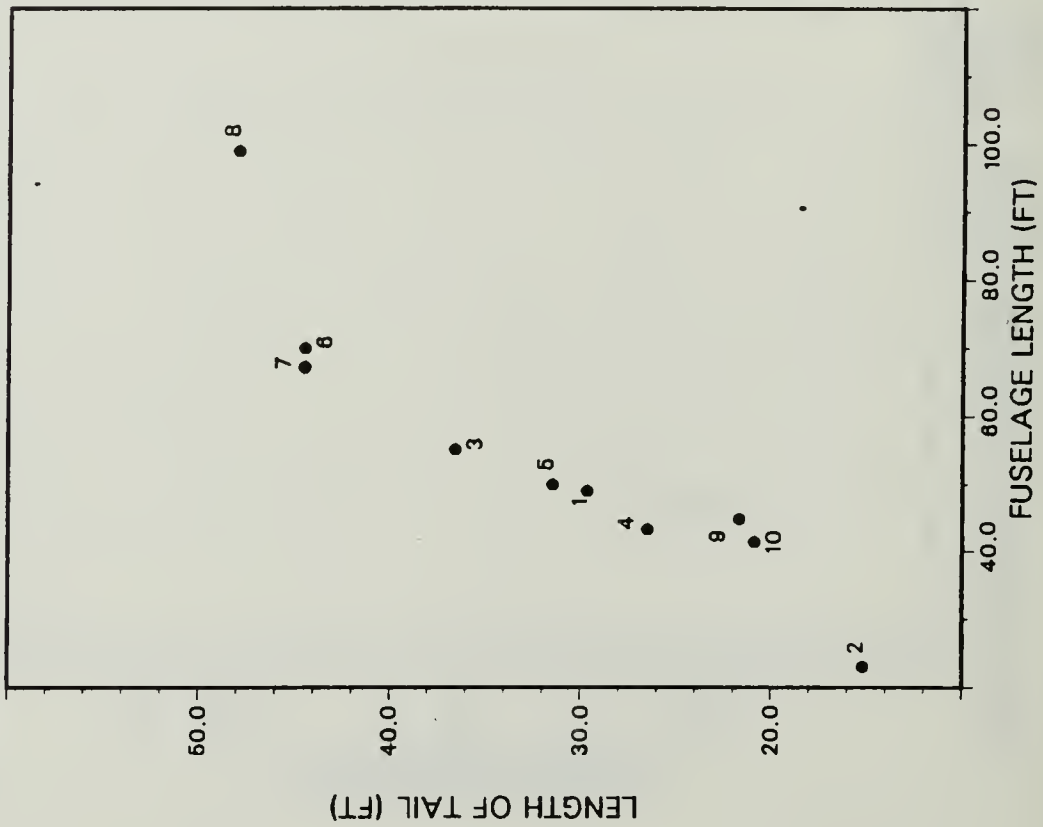


Fig. 18-26a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

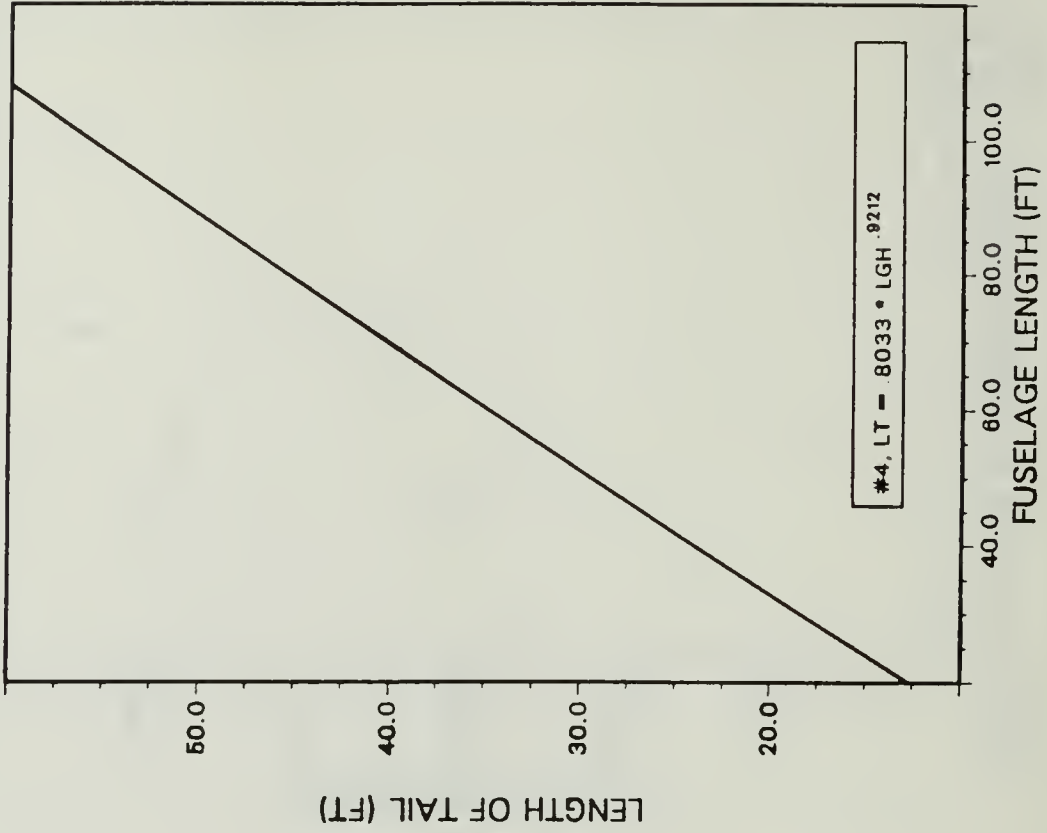


Fig. 18-26b.

Fig. 18-26a and 18-26b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

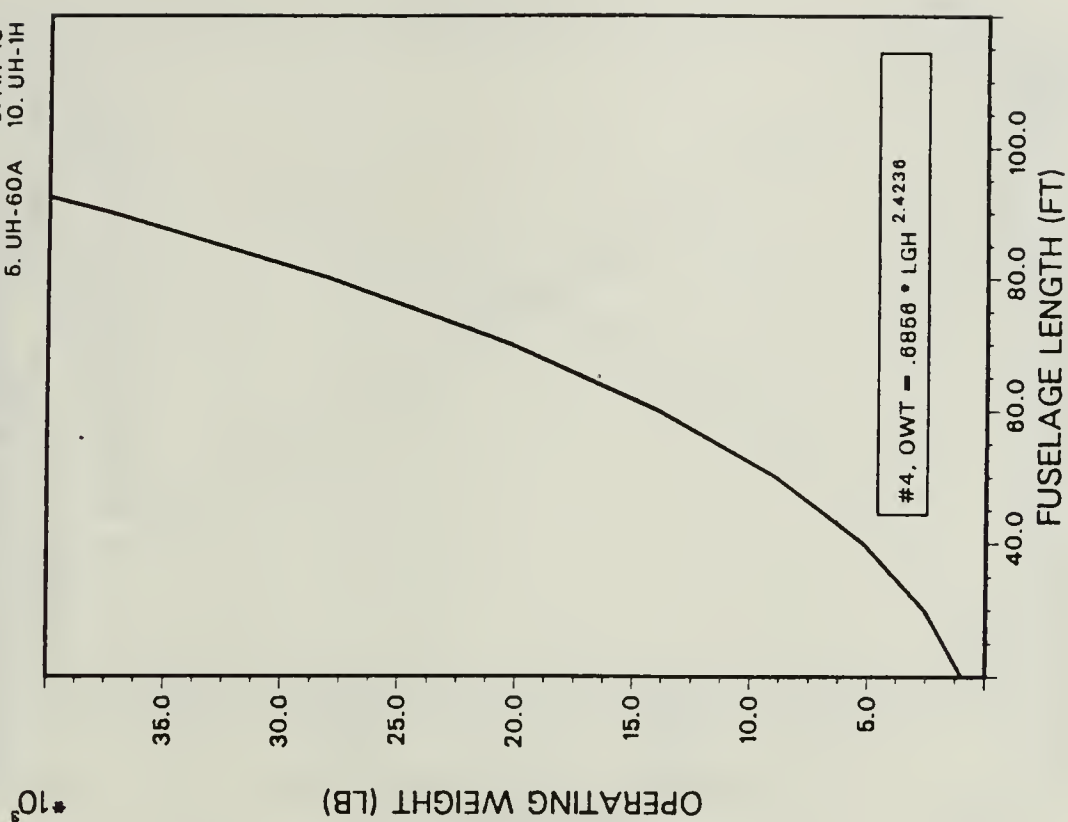


Fig. 18-27b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

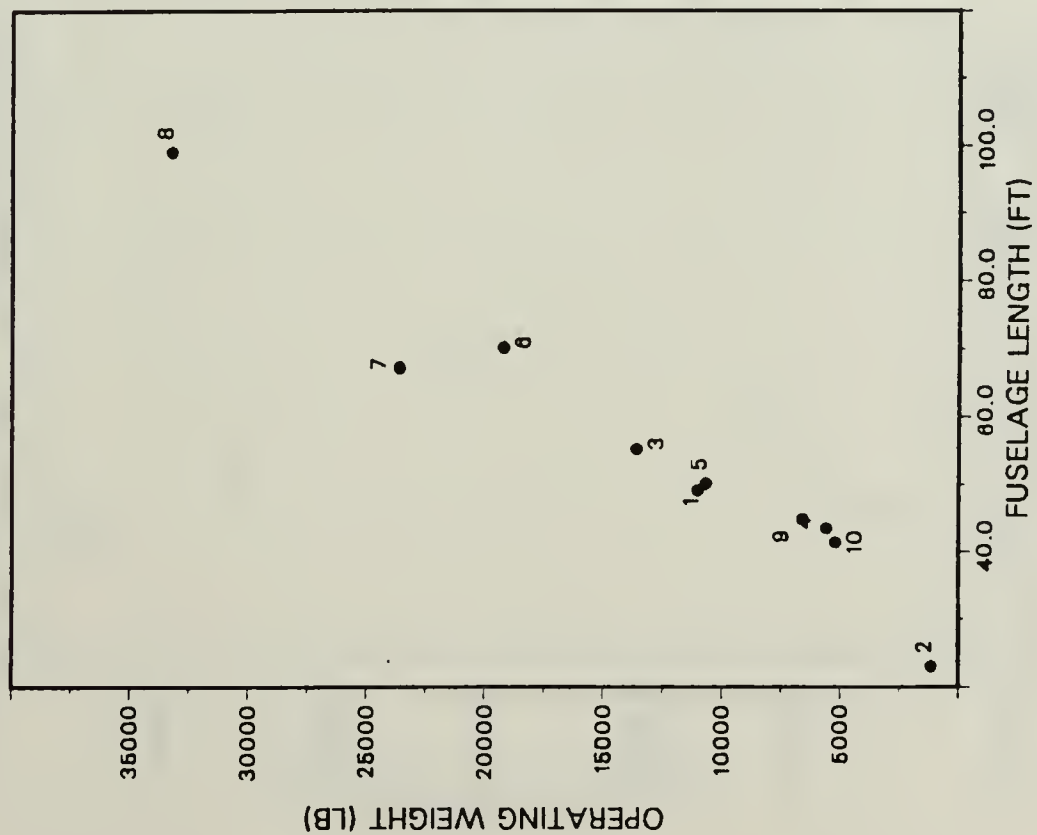


Fig. 18-27a.

Fig. 18-27a and 18-27b.

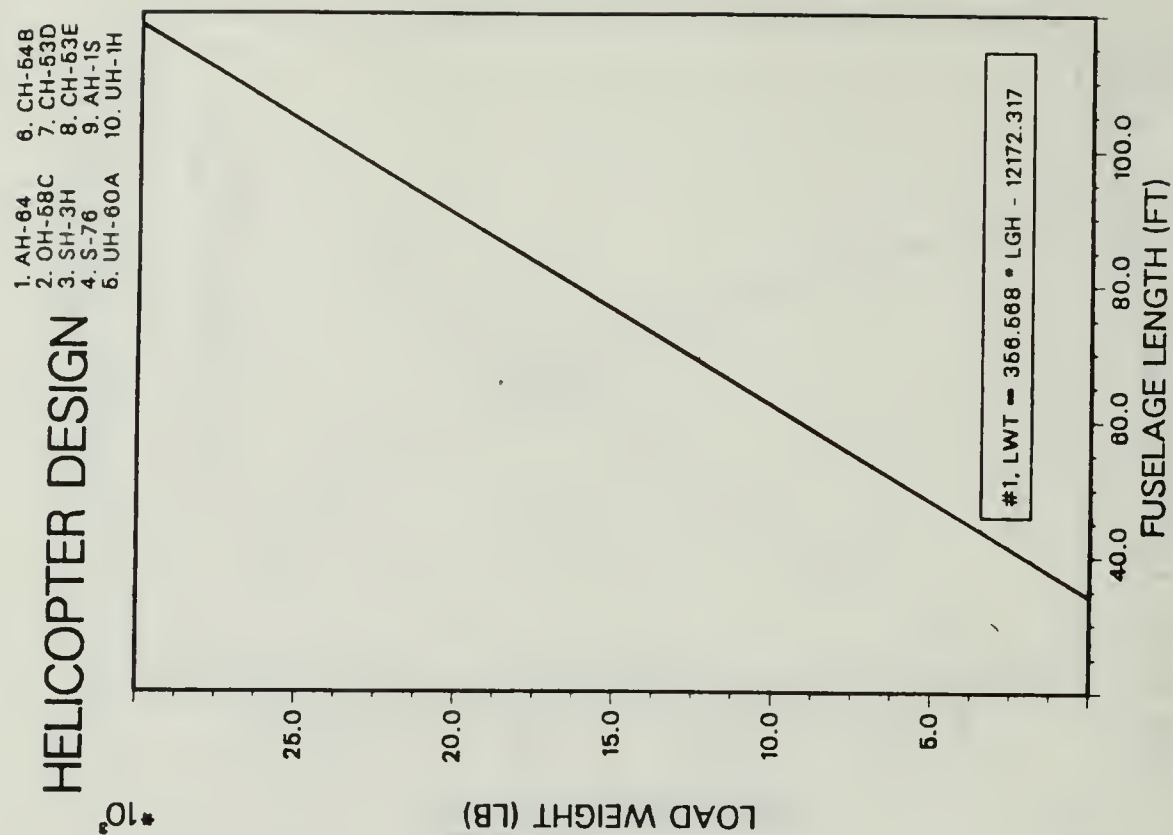


Fig. 18-28b.

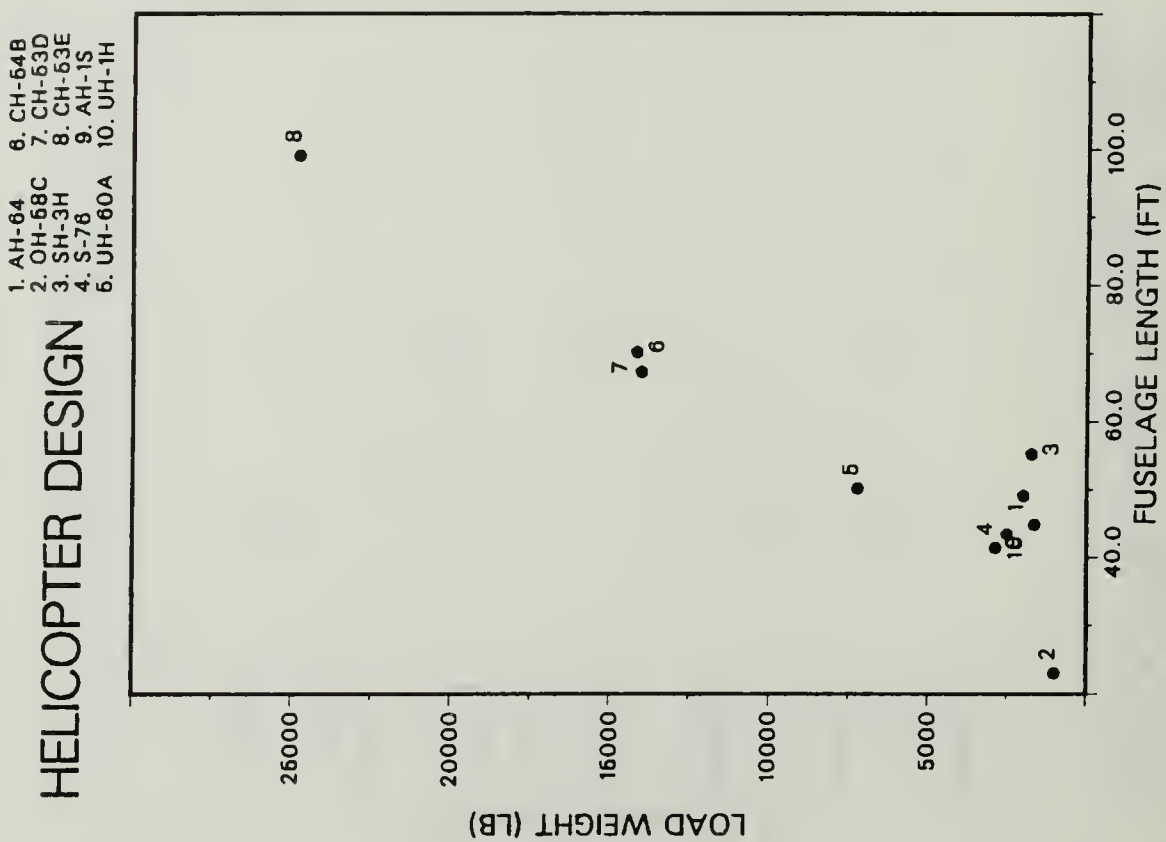


Fig. 18-28a.

Fig. 18-28a and 18-28b.

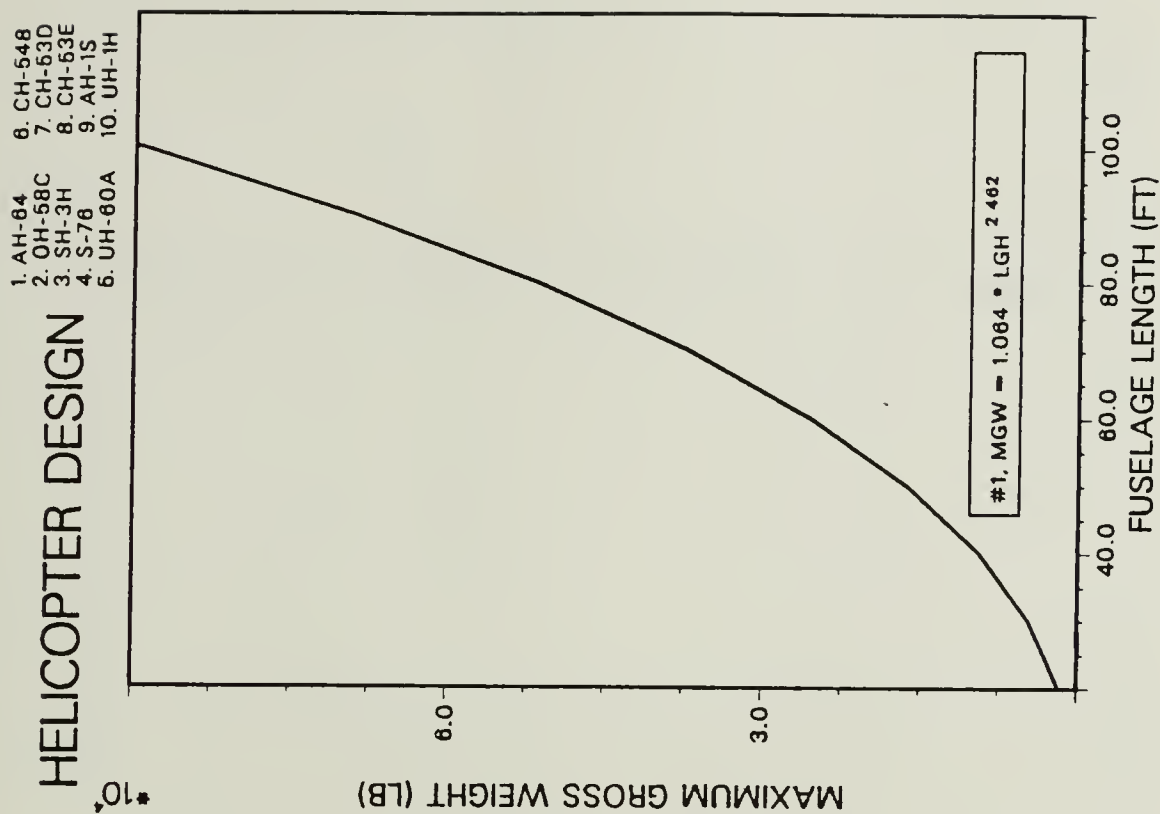


Fig. 18-30b.

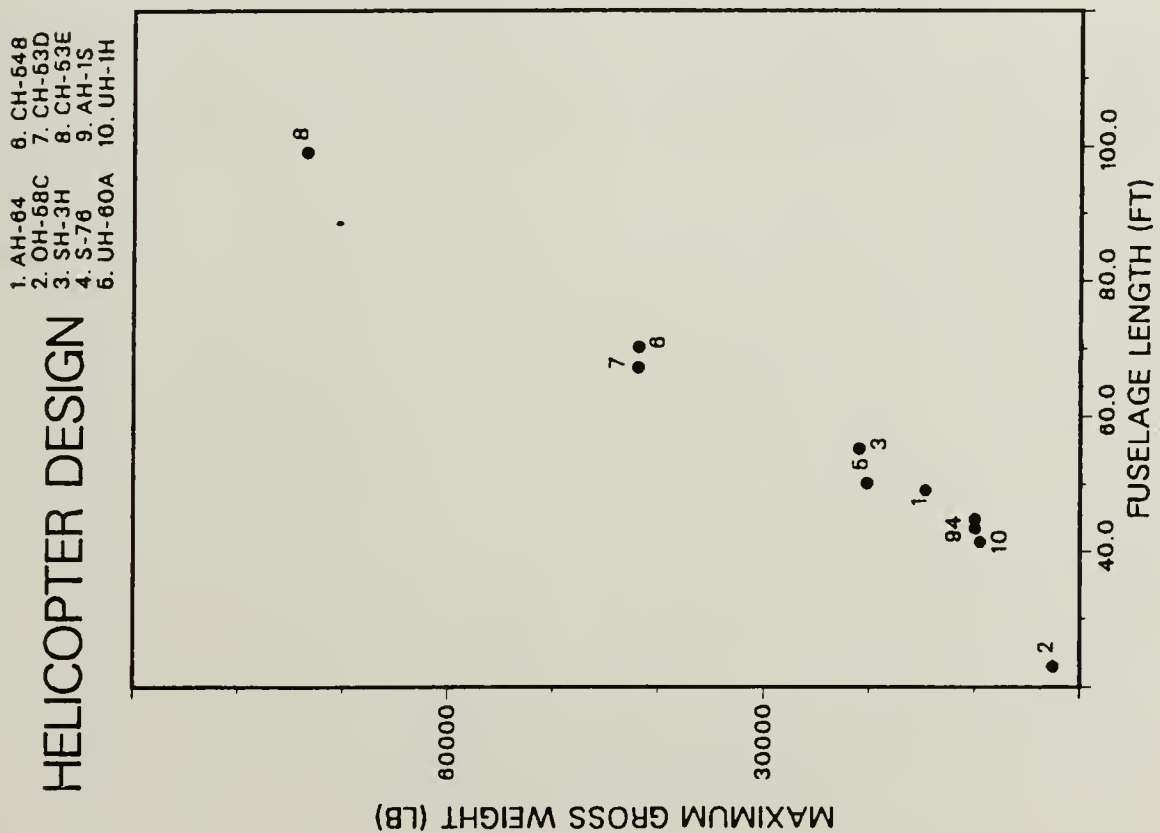


Fig. 18-30a.

Fig. 18-30a and 18-30b.

Frontal Horizontal Flat Plate Area Pairings.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

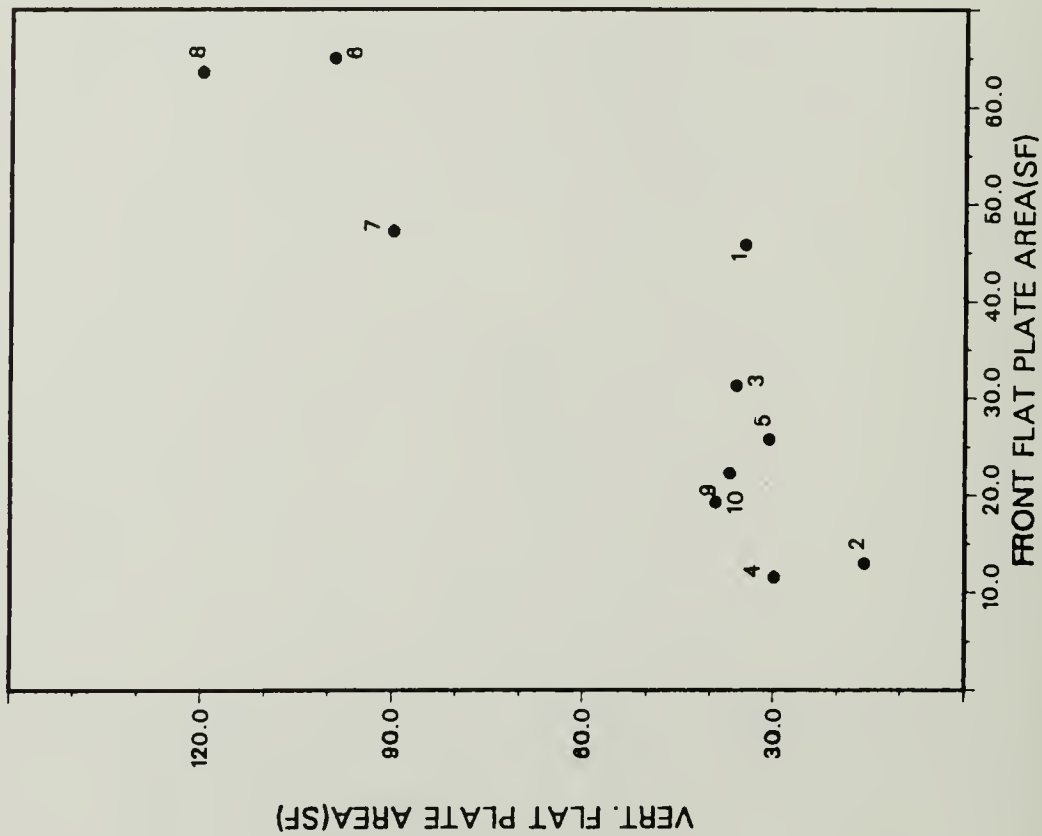


Fig. 19-20.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

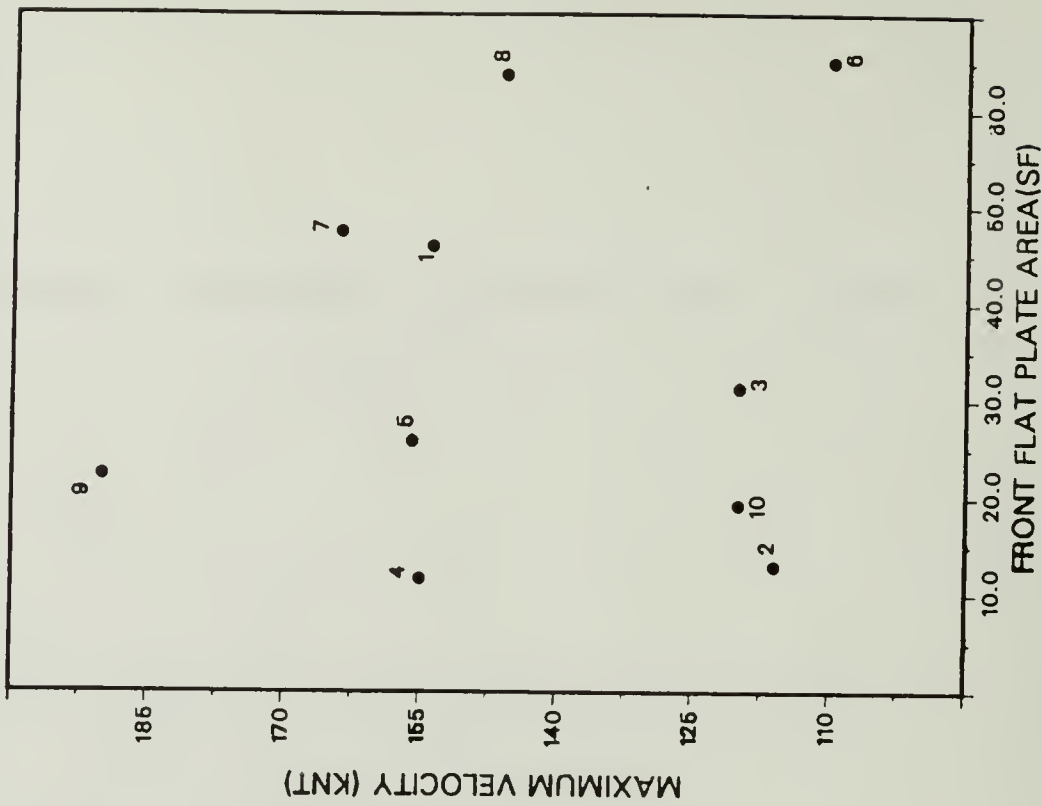


Fig. 19-21.

Fig. 19-20 and 19-21.

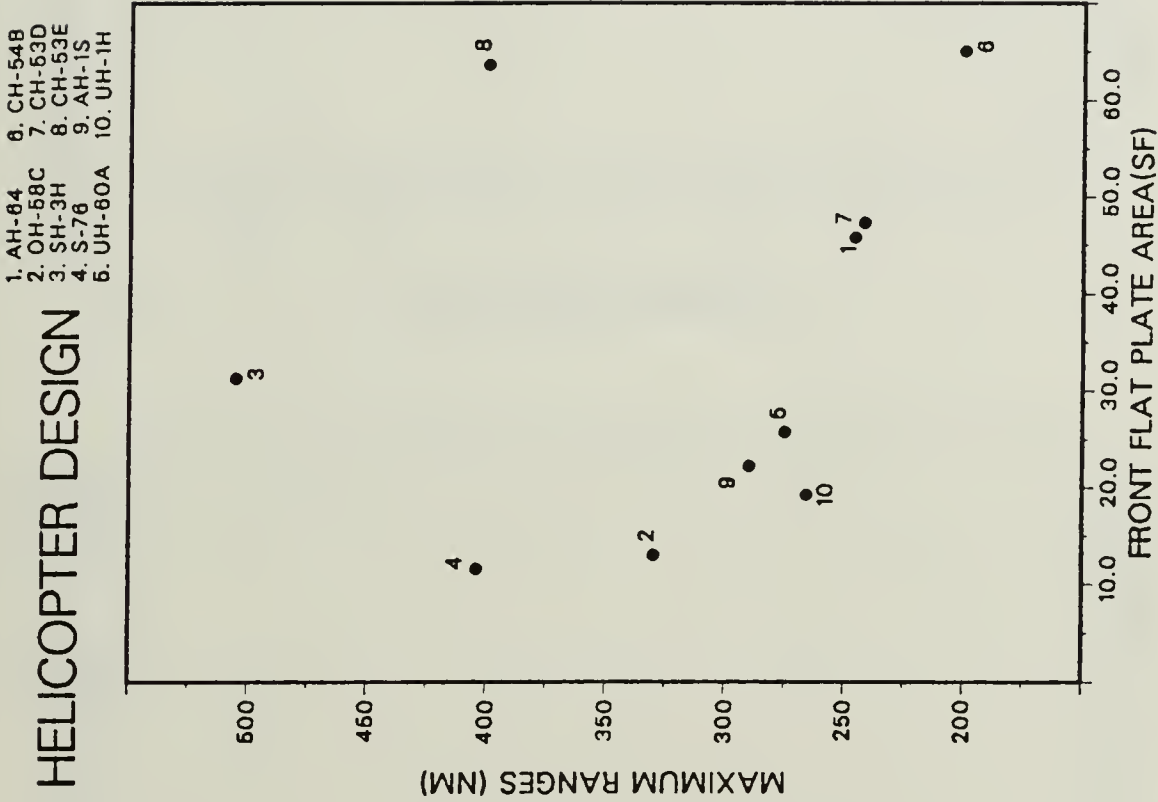


Fig. 19-22.

Fig. 19-22.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

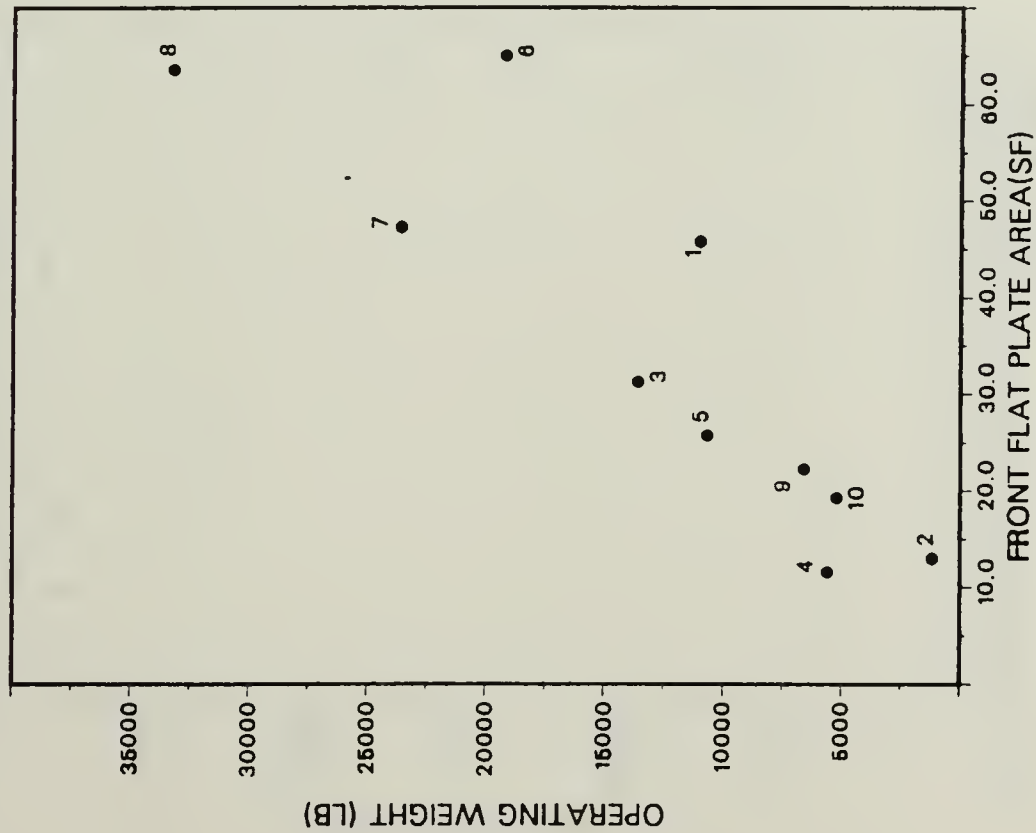


Fig. 19-27a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

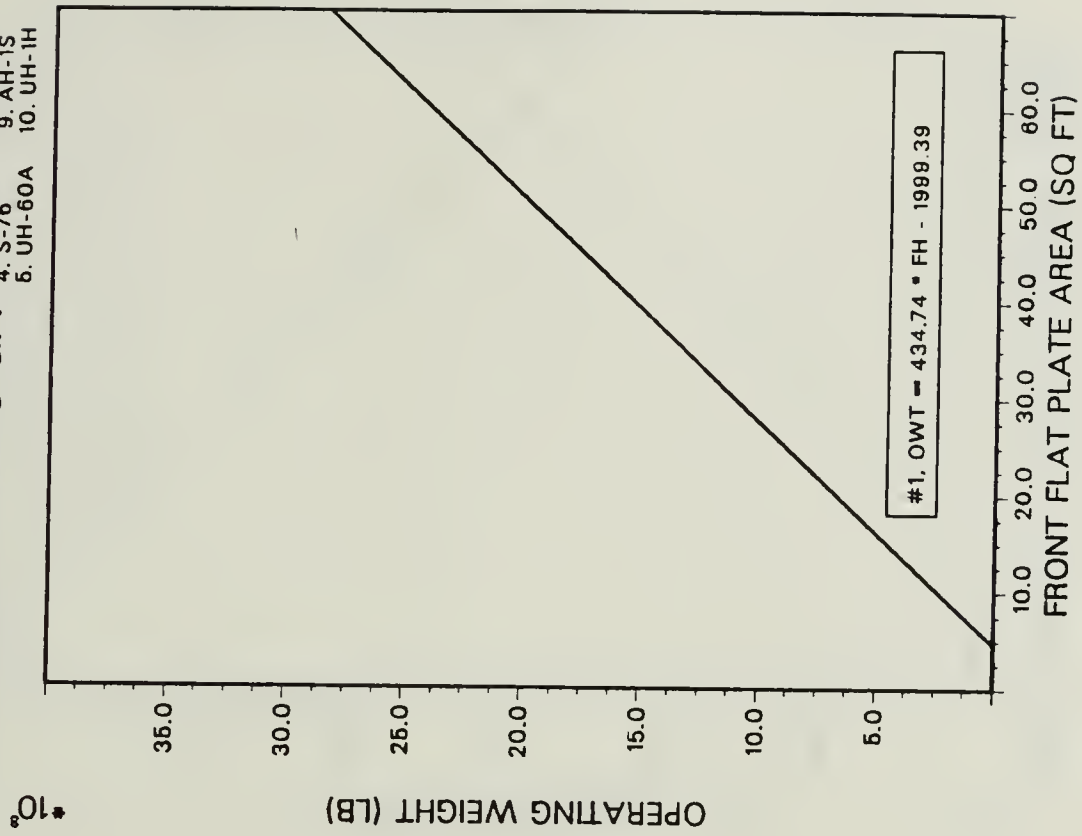


Fig. 19-27b.

Fig. 19-27a and 19-27b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

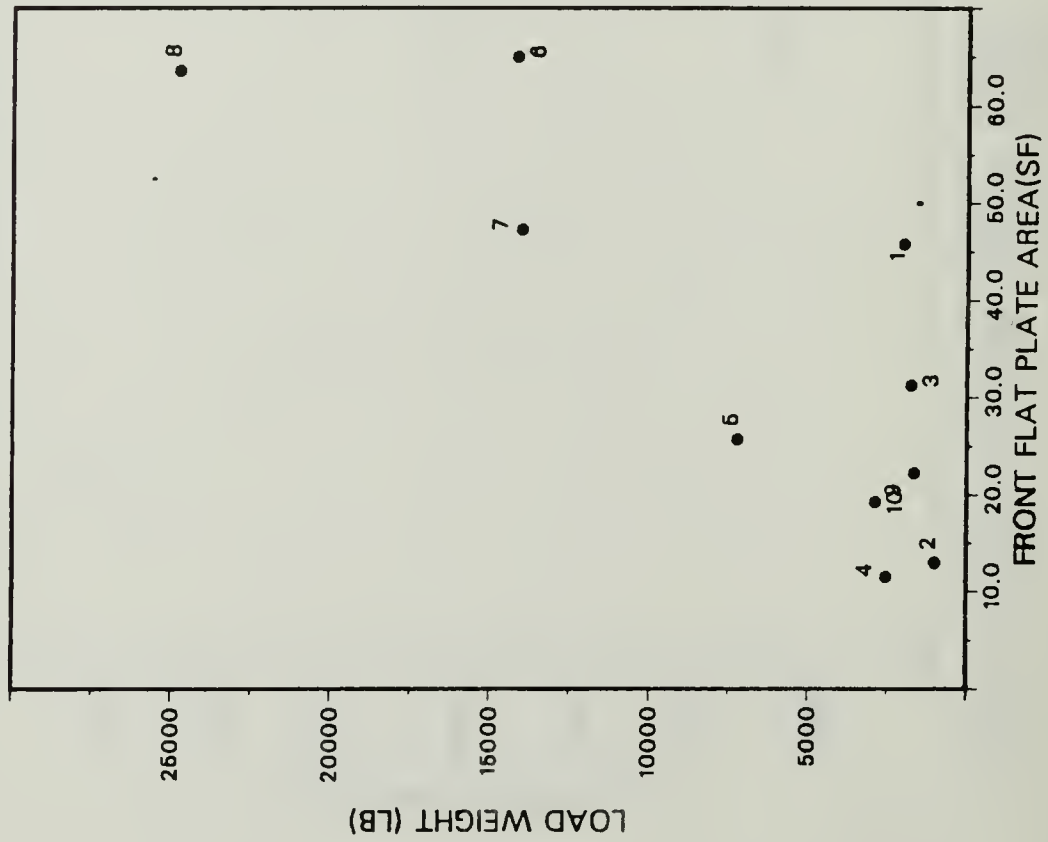


Fig. 19-28a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

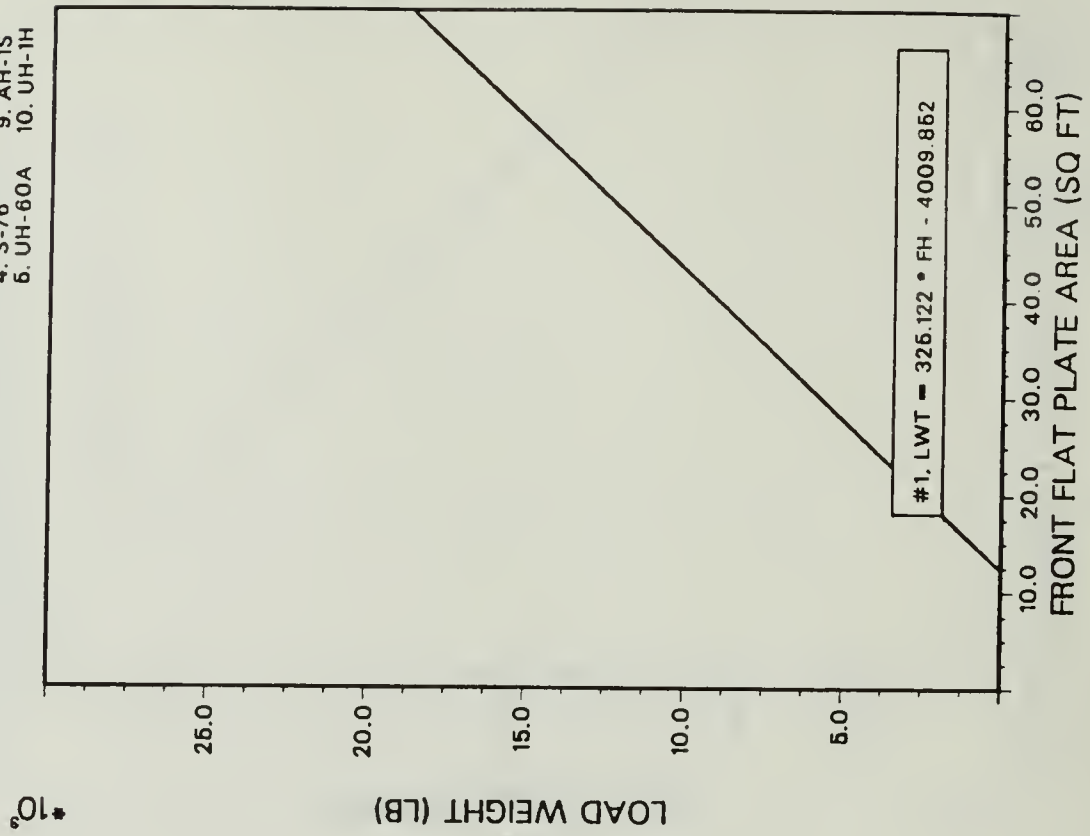


Fig. 19-28b.

Fig. 19-28a and 19-28b.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

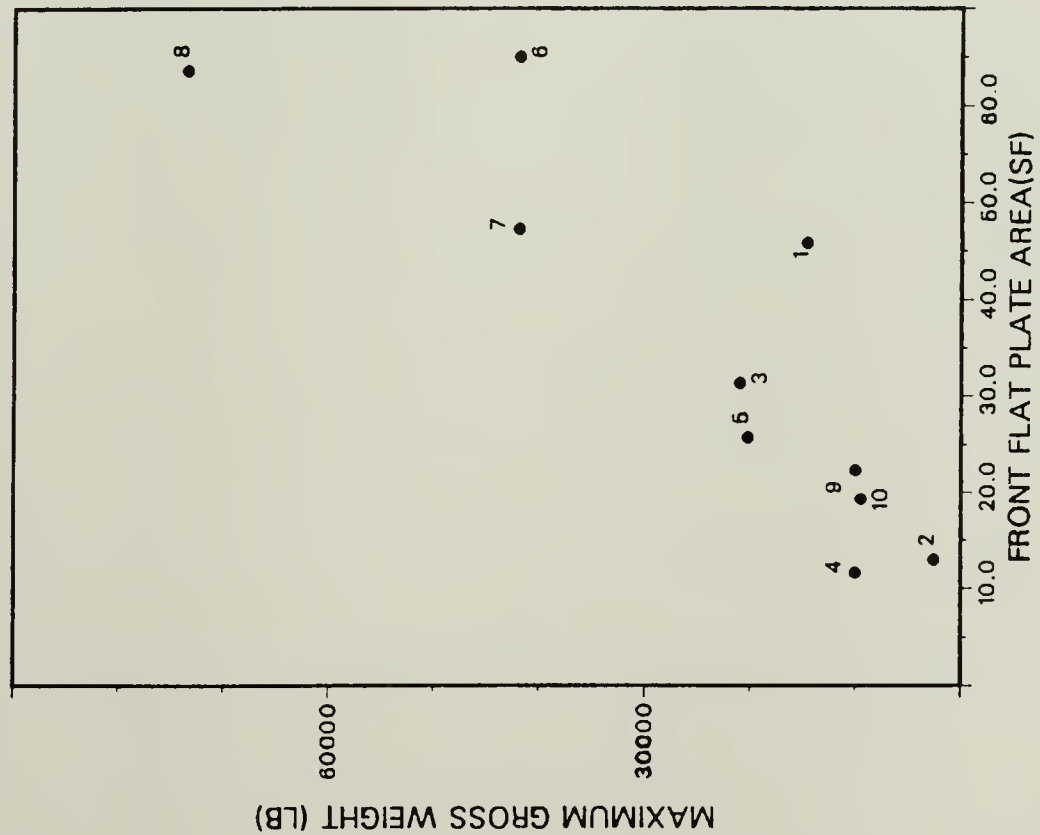


Fig. 19-30a.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

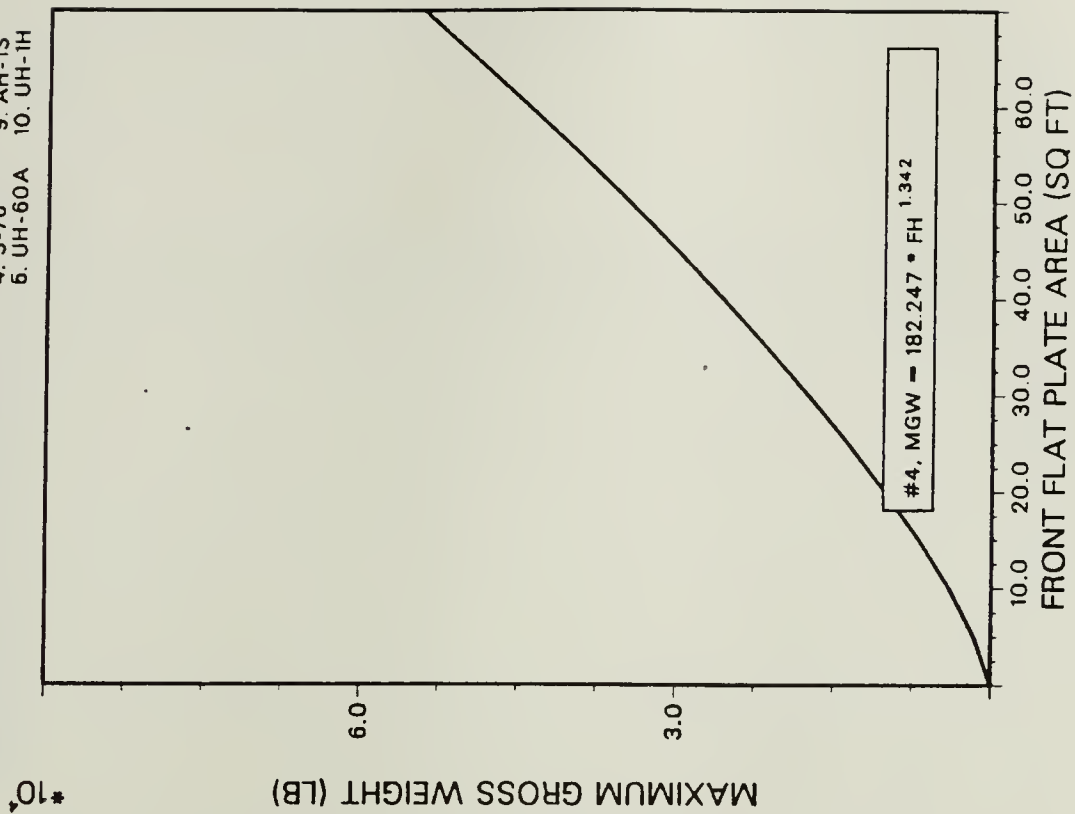


Fig. 19-30b.

Fig. 19-30a and 19-30b.

Frontal Vertical Flat Plate Area Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

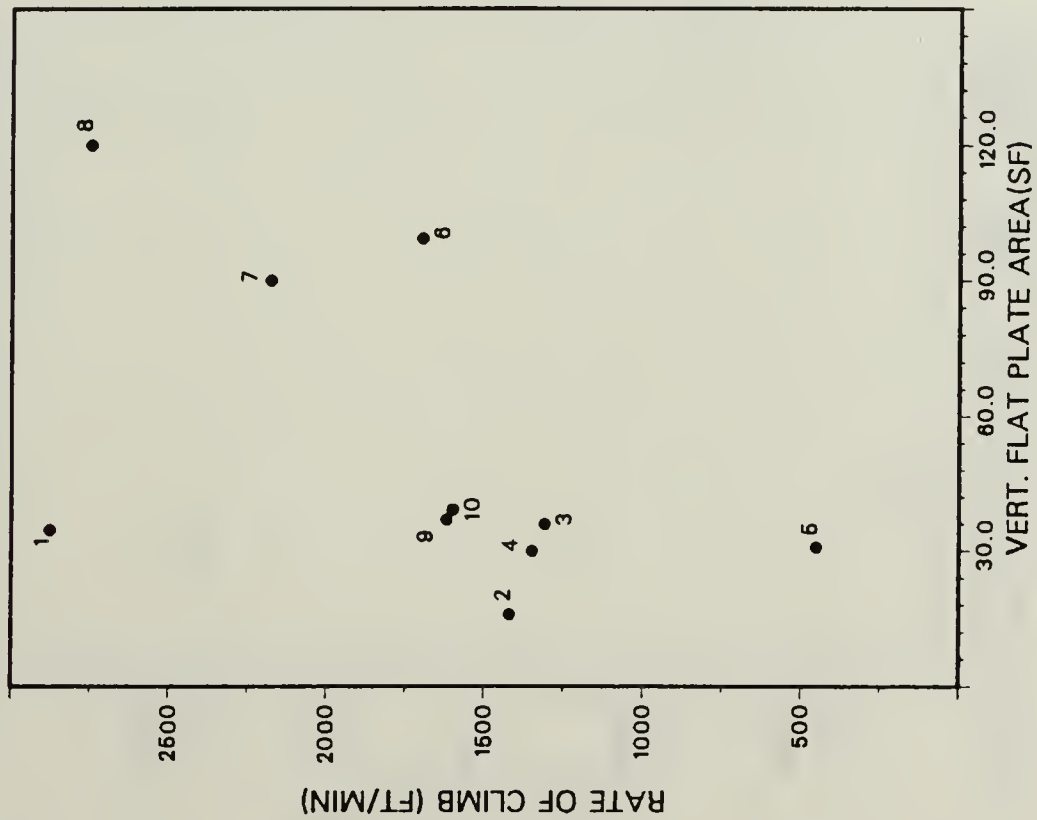


Fig. 20-23.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

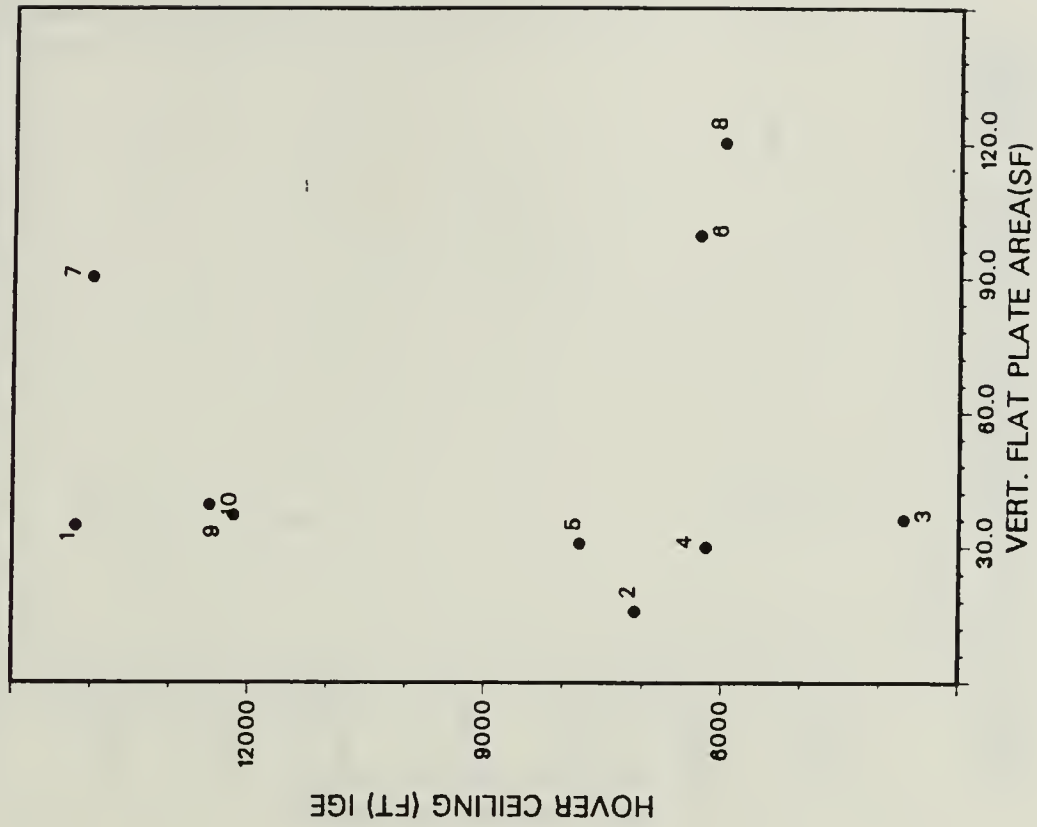


Fig. 20-24.

Fig. 20-23 and 20-24.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

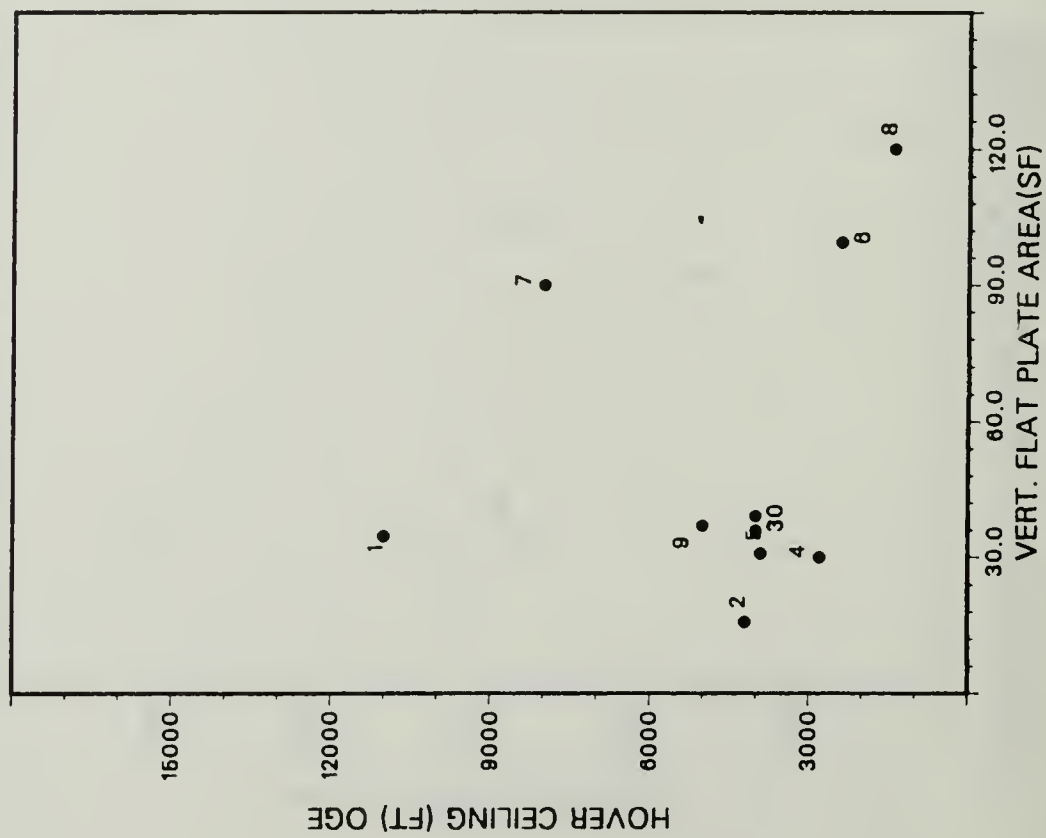


Fig. 20-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

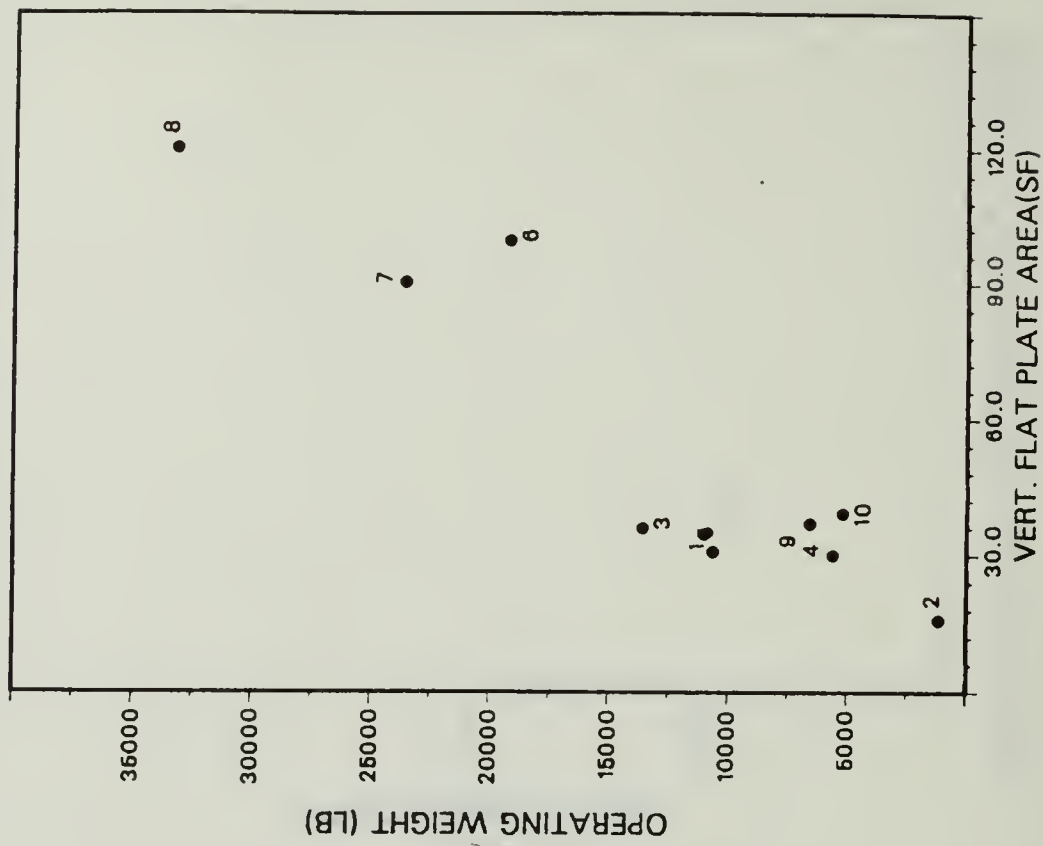


Fig. 20-27.

Fig. 20-25 and 20-27.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

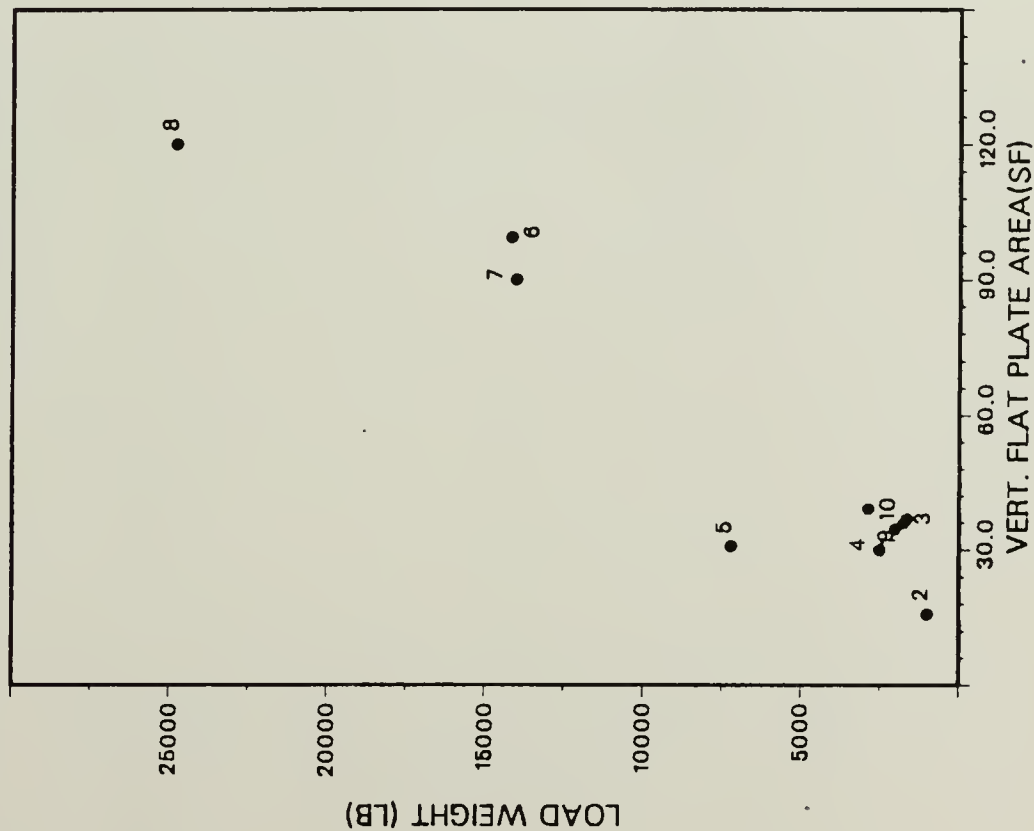


Fig. 20-28.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

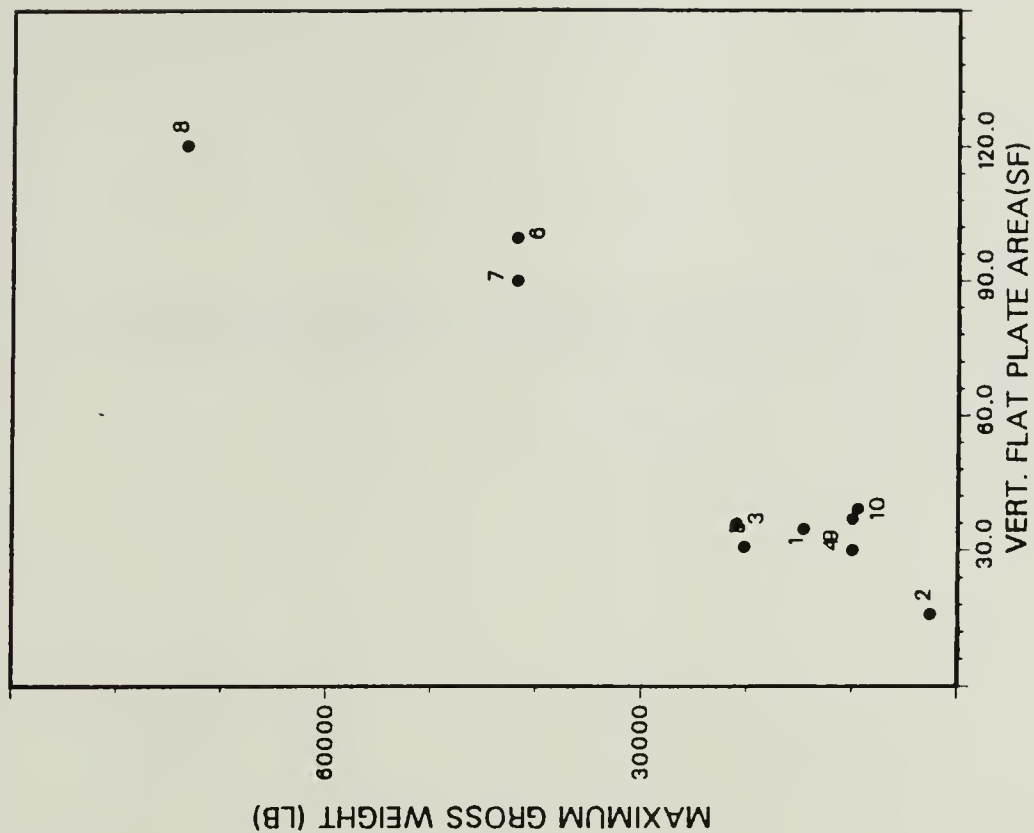


Fig. 20-30.

Fig. 20-28 and 20-30.

Maximum Forward Velocity Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

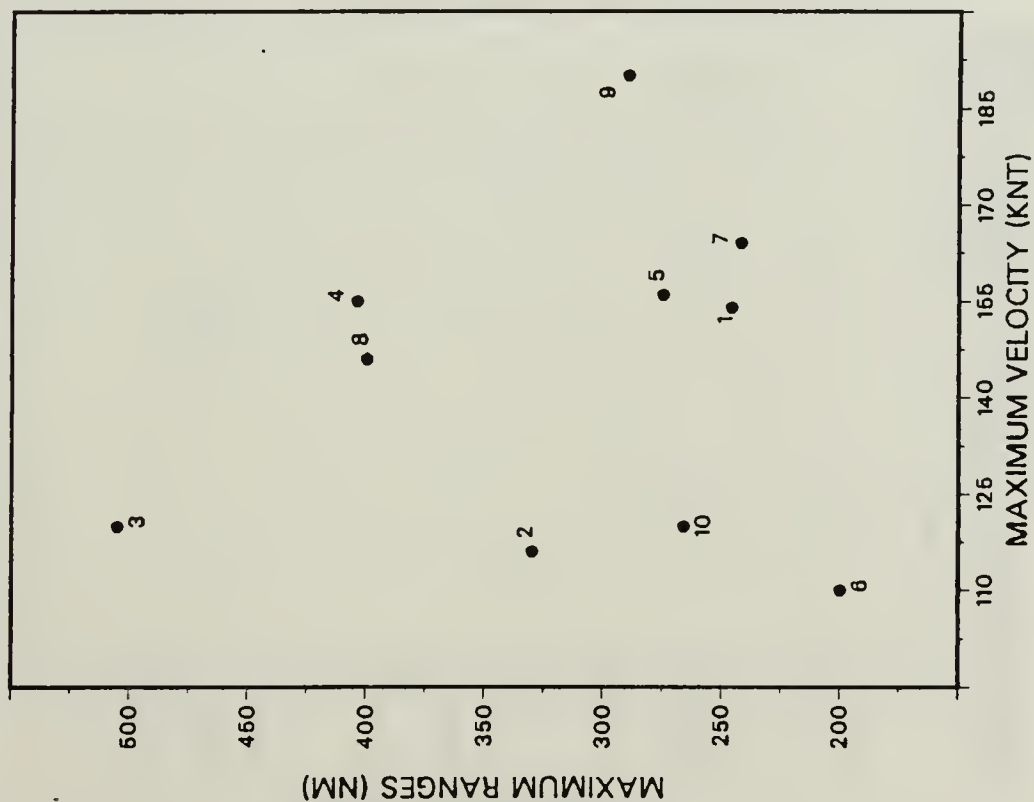


Fig. 21-22.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

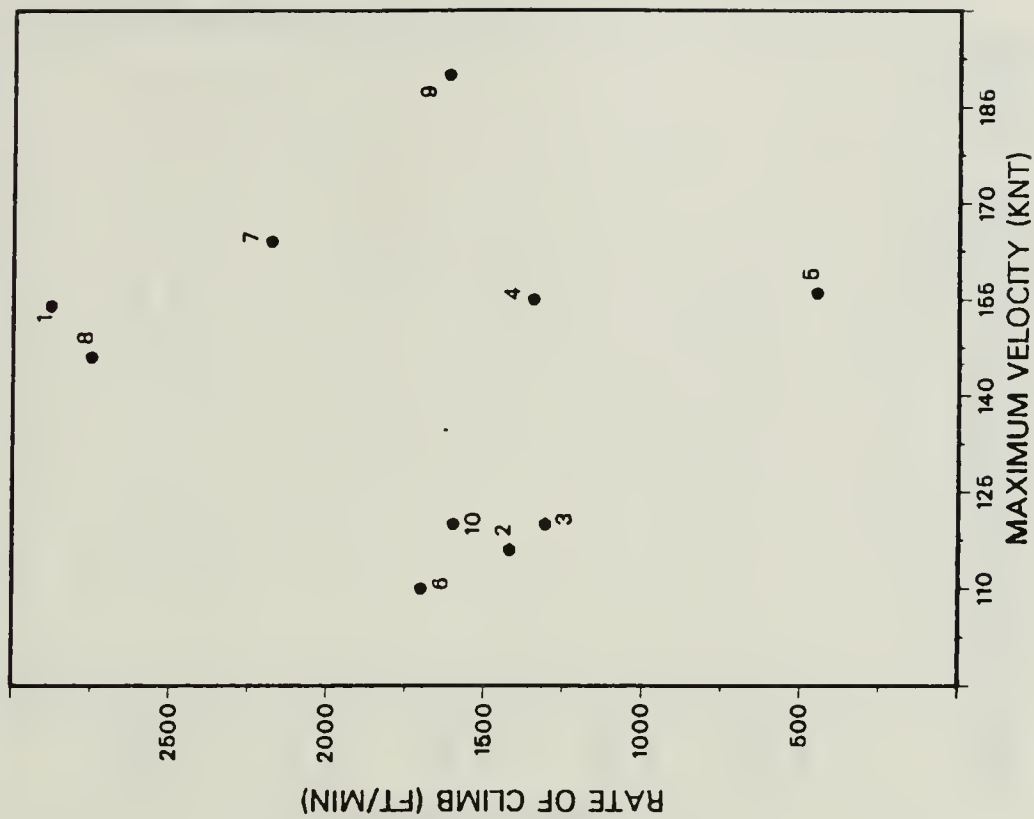


Fig. 21-23.

Fig. 21-22 and 21-23.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

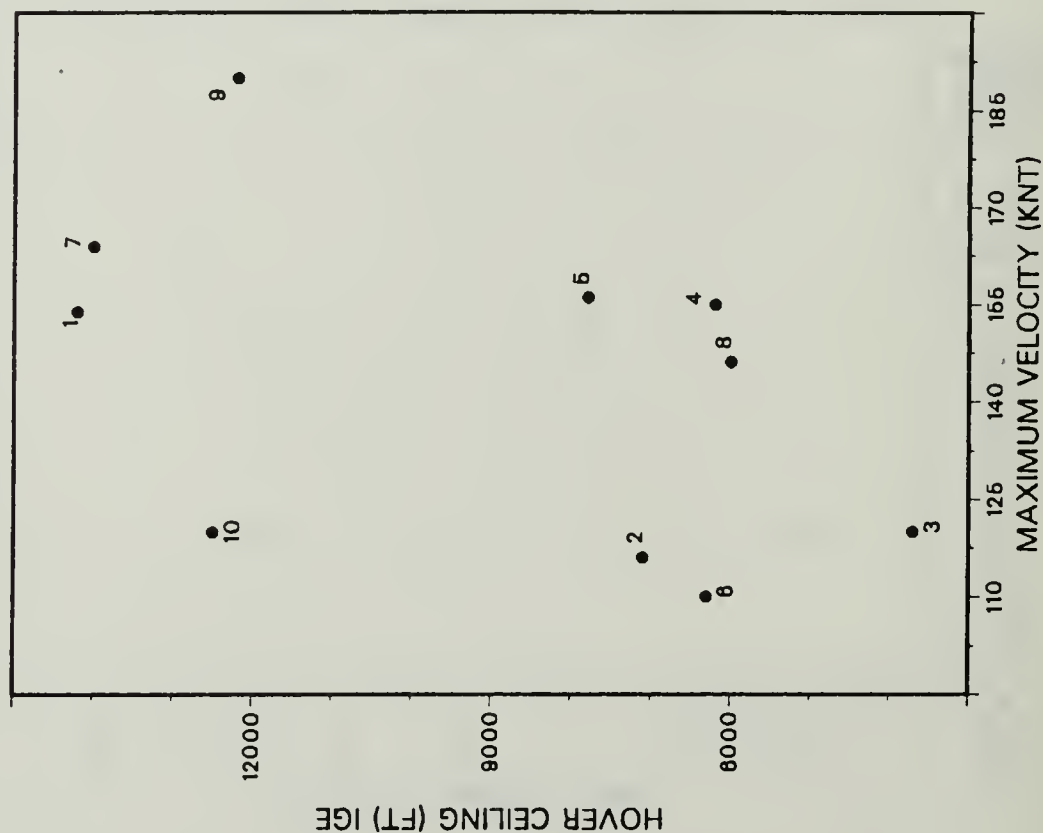


Fig. 21-24.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

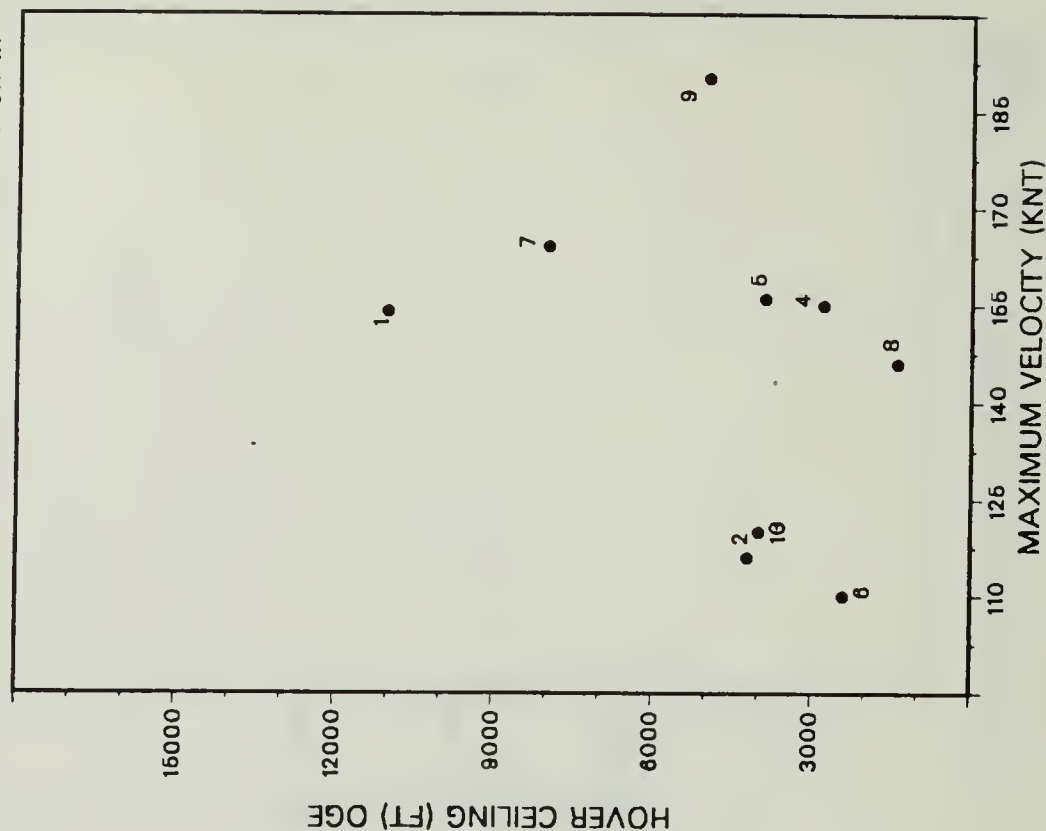


Fig. 21-25.

Fig. 21-24 and 21-25.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

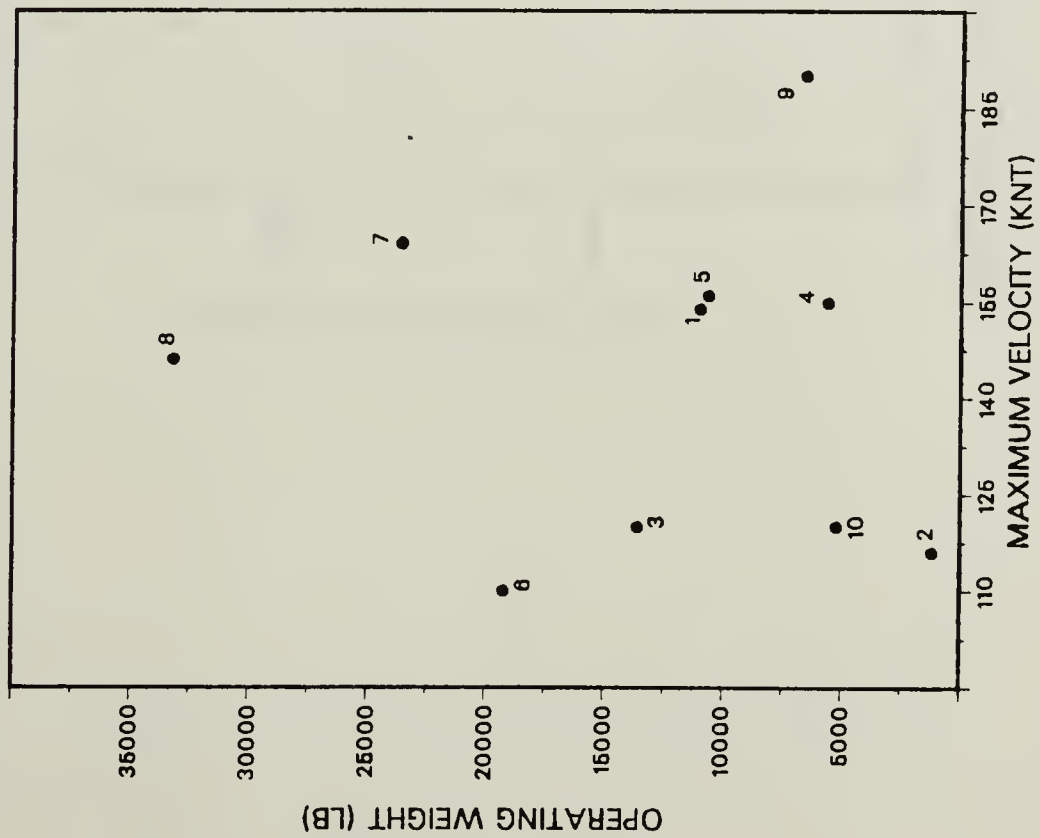


Fig. 21-27.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

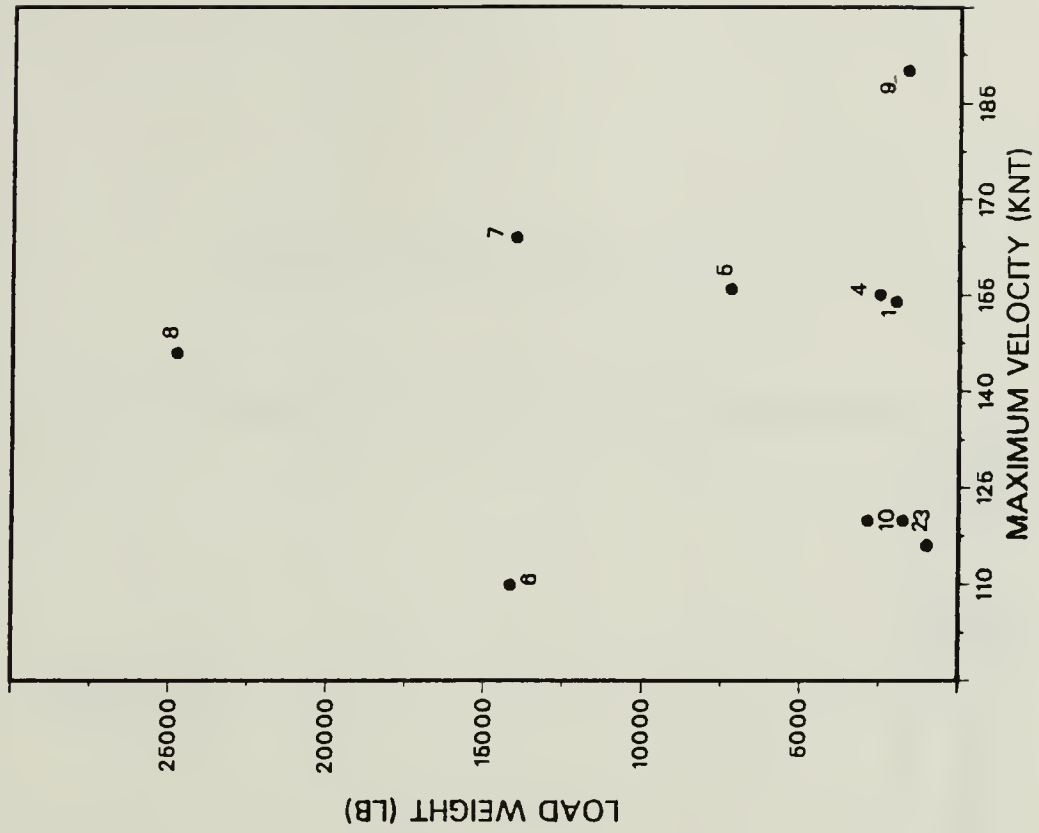


Fig. 21-28.

Fig. 21-27 and 21-28.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

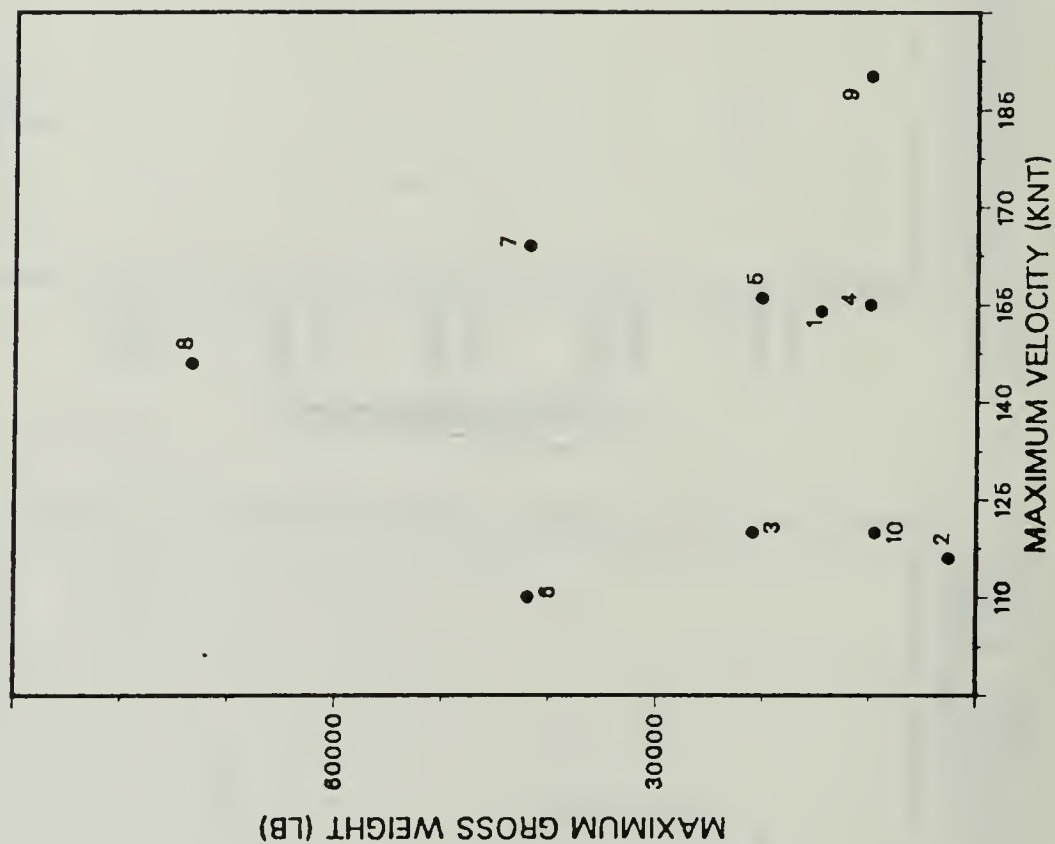


Fig. 21-30.

Fig. 21-30.

Maximum Range Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

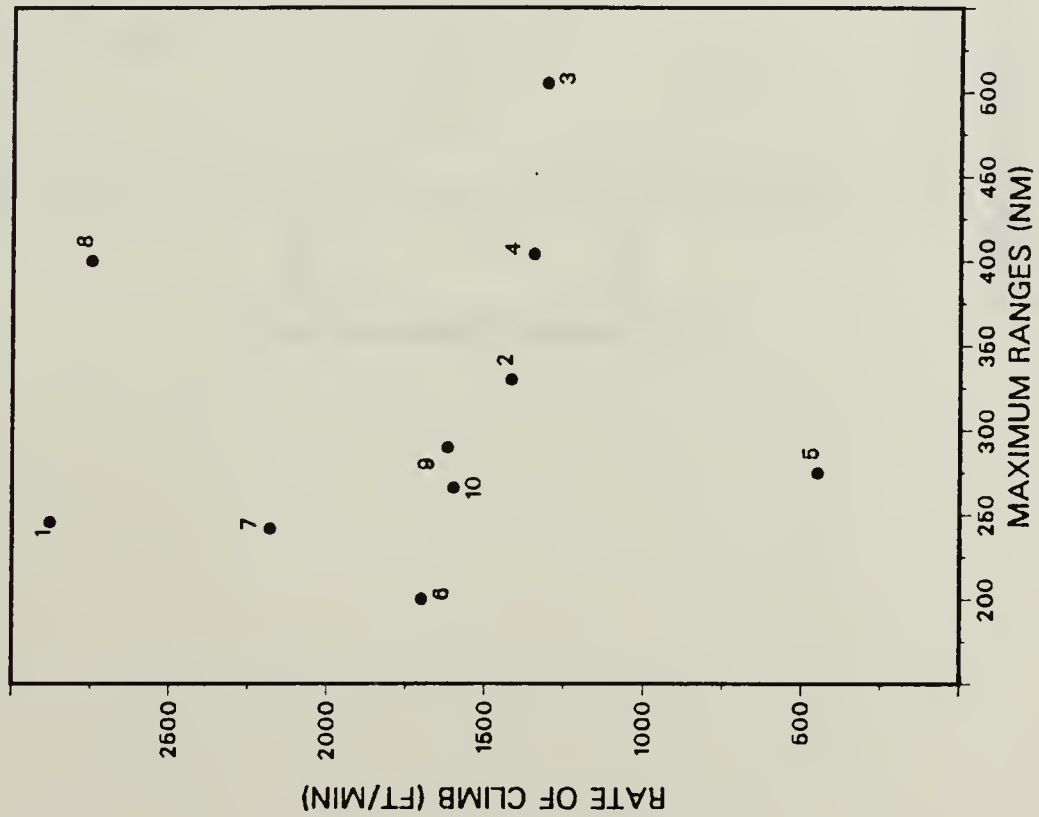


Fig. 22-23.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-64B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

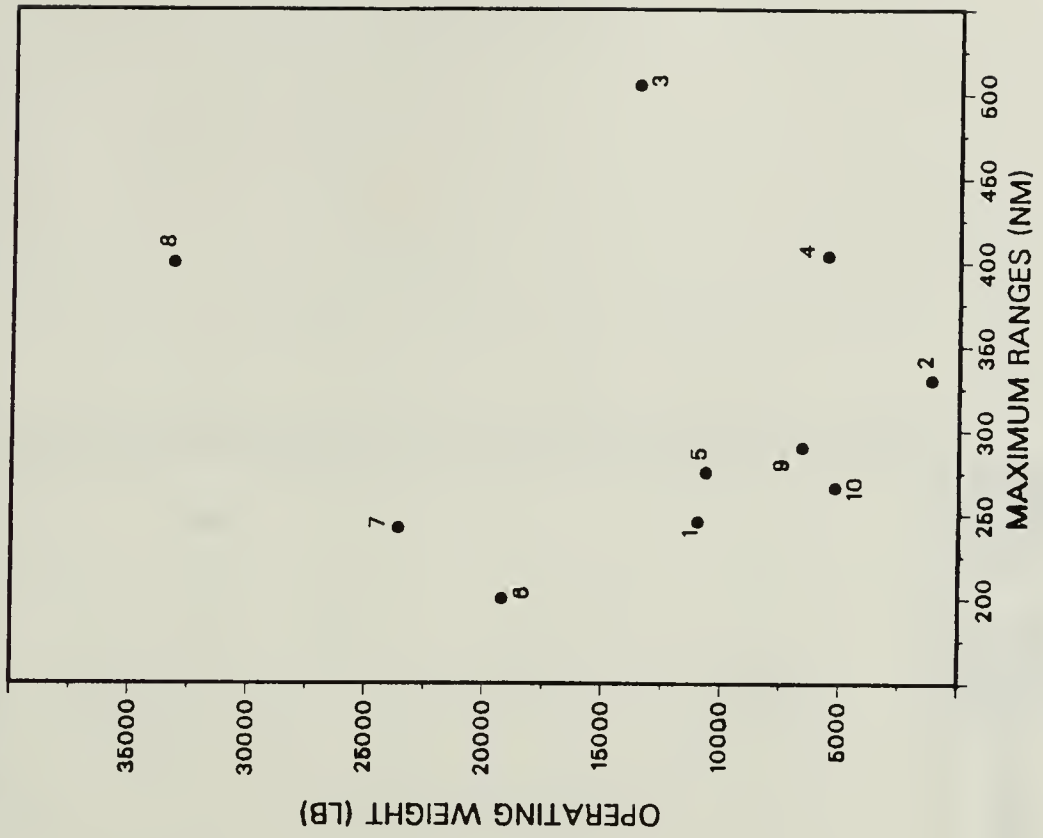


Fig. 22-27.

Fig. 22-23 and 22-27.

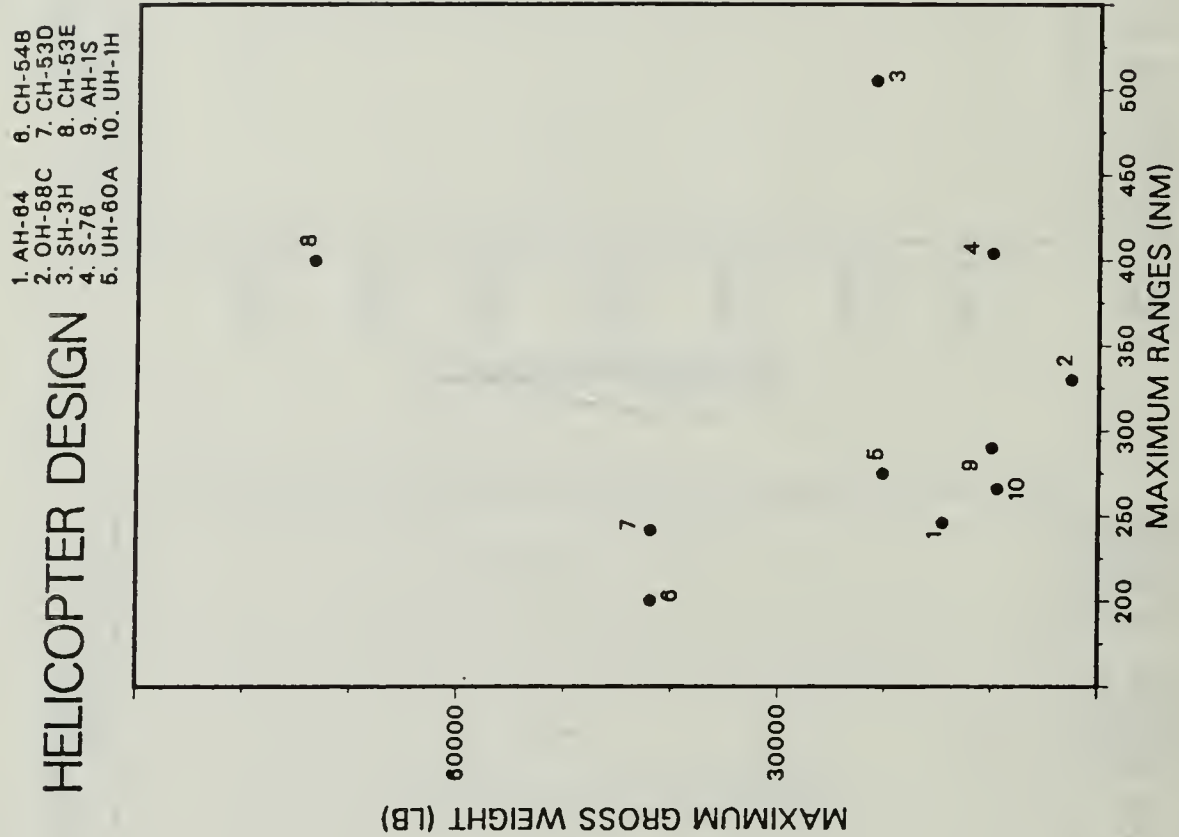


Fig. 22-30.

Fig. 22-30.

Rate of Climb Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

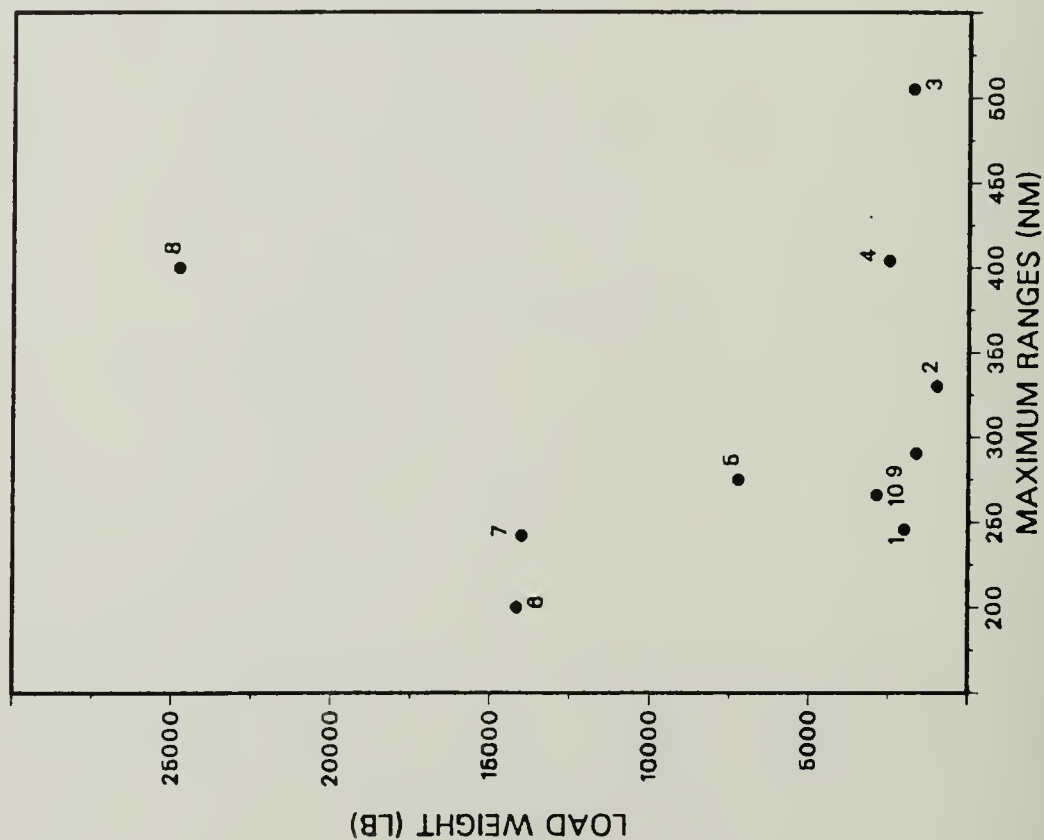


Fig. 22-28.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

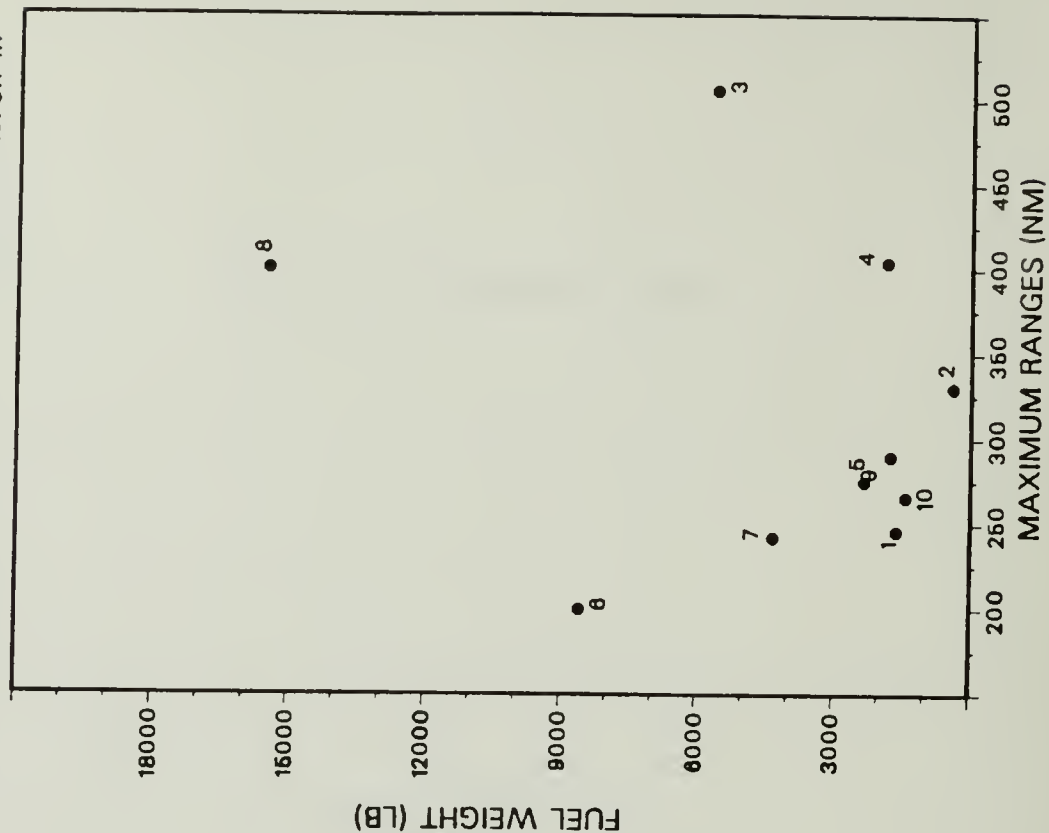


Fig. 22-29.

Fig. 22-28 and 22-29.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

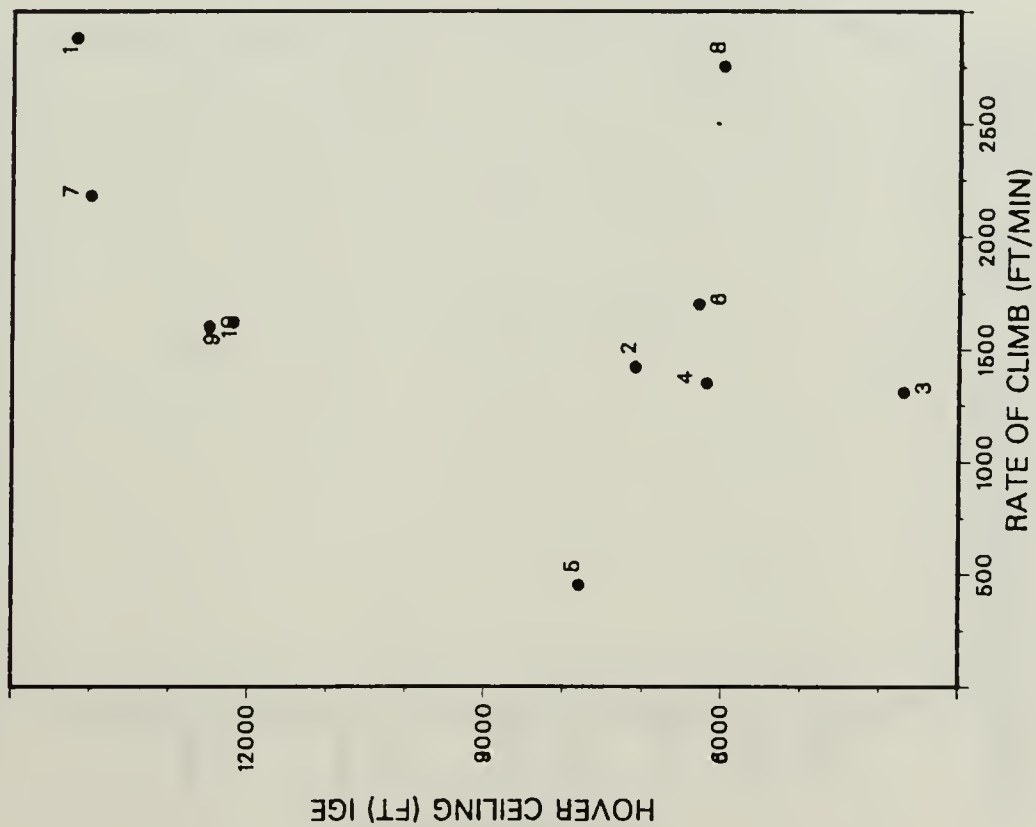


Fig. 23-24.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

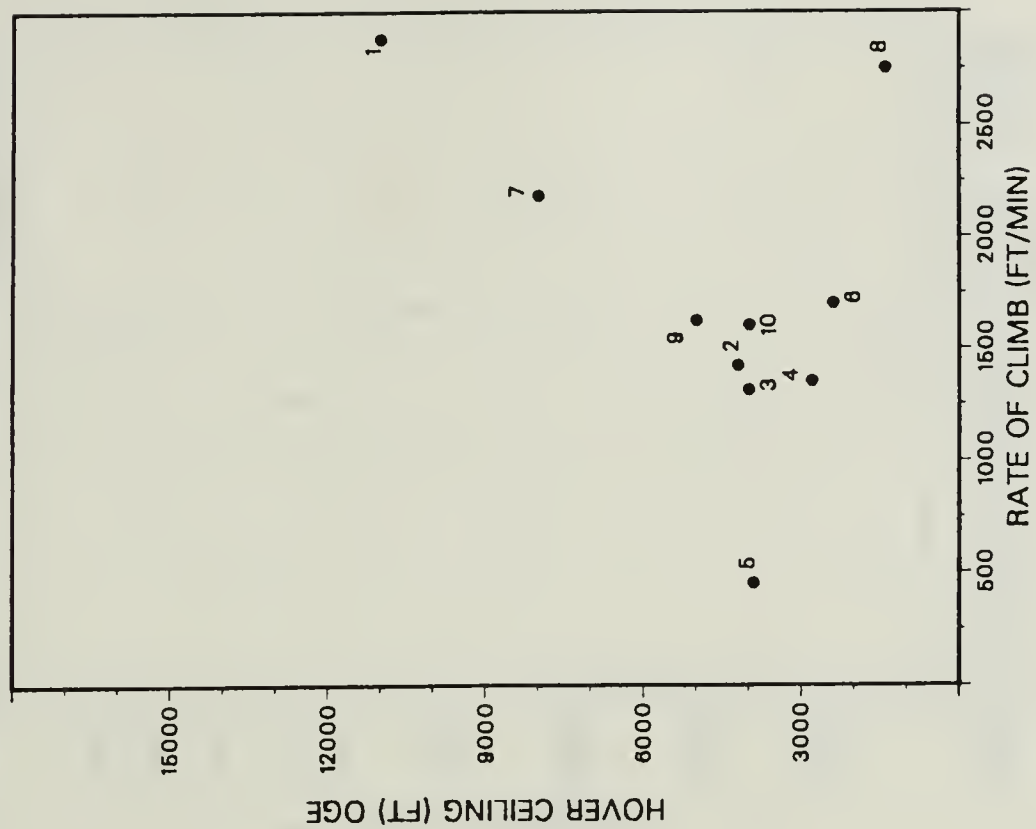


Fig. 23-25.

Fig. 23-24 and 23-25.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

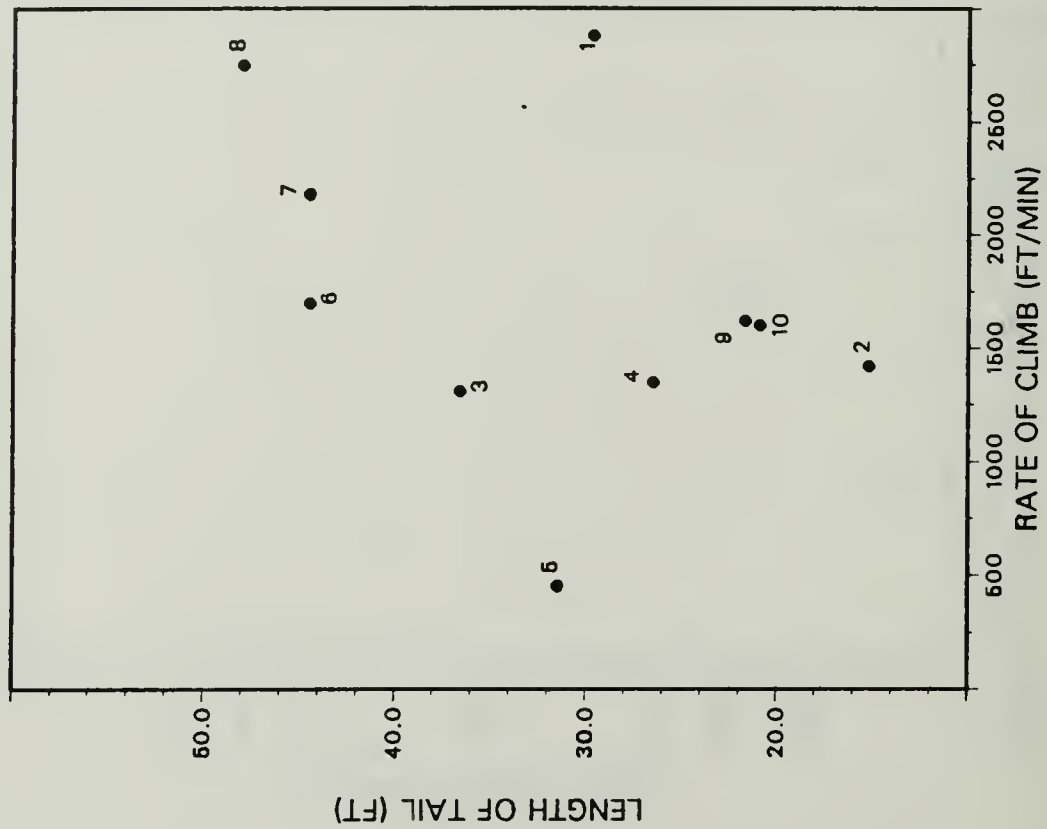


Fig. 23-26.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

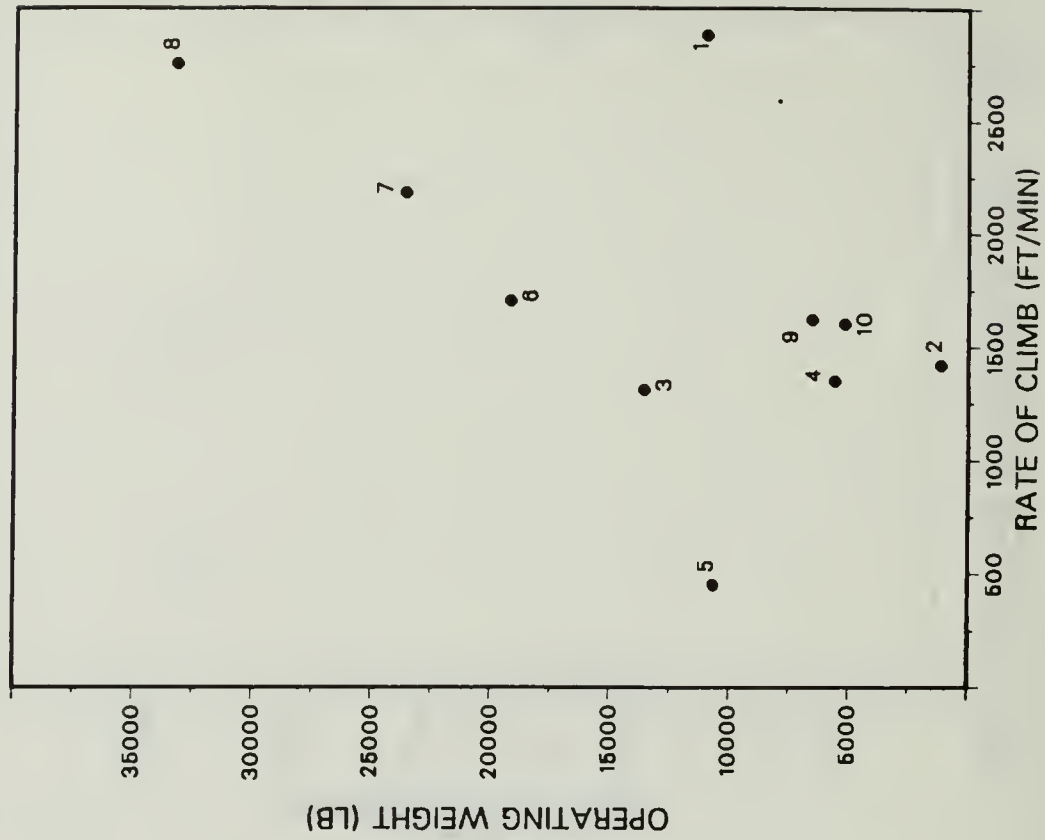


Fig. 23-27.

Fig. 23-26 and 23-27.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

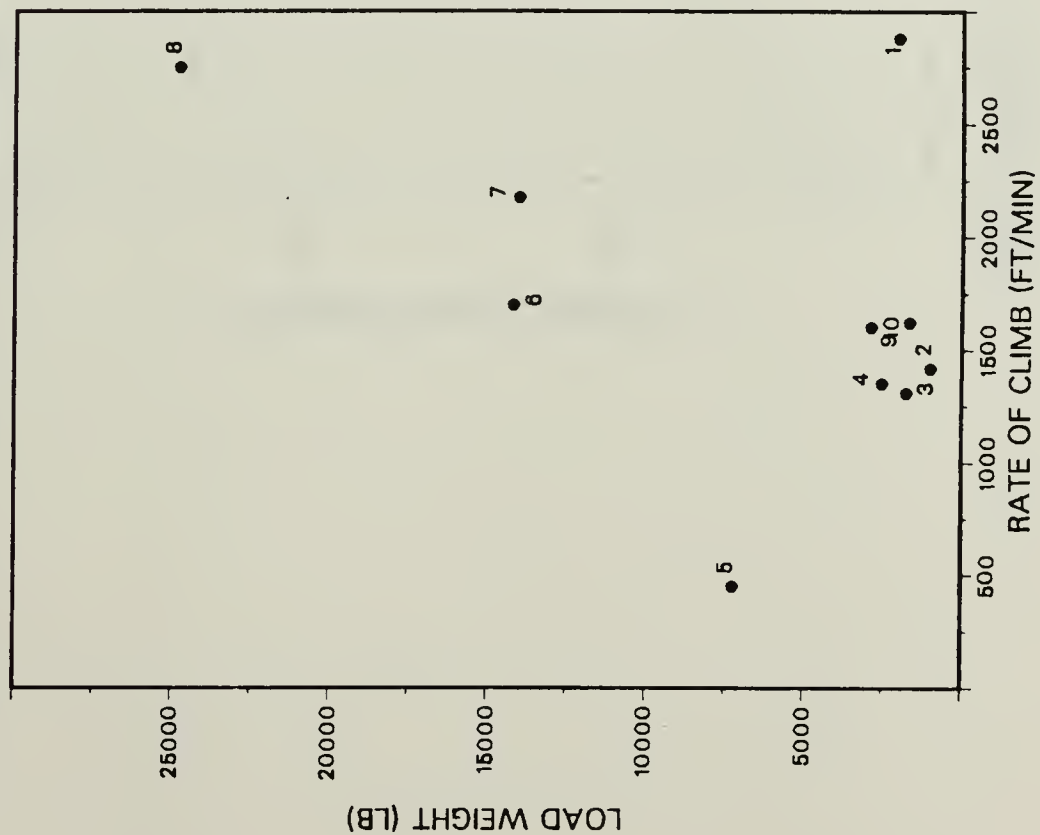


Fig. 23-28.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

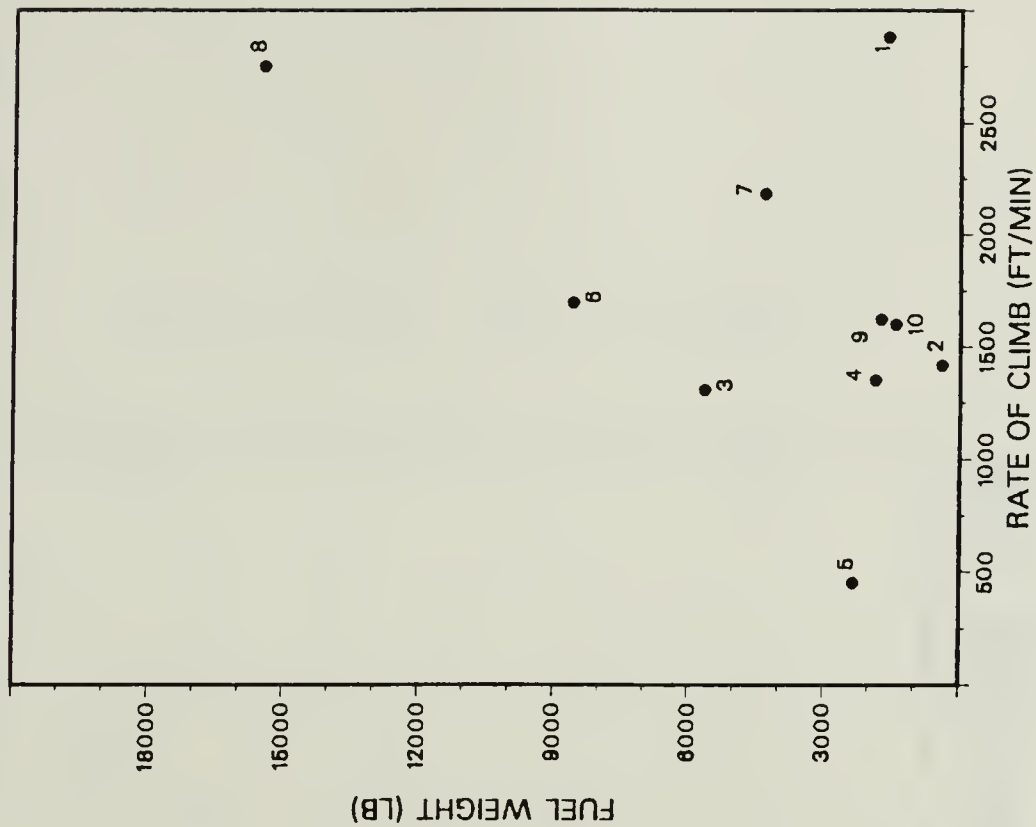


Fig. 23-29.

Fig. 23-28 and 23-29.

1. AH-64
2. OH-68C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

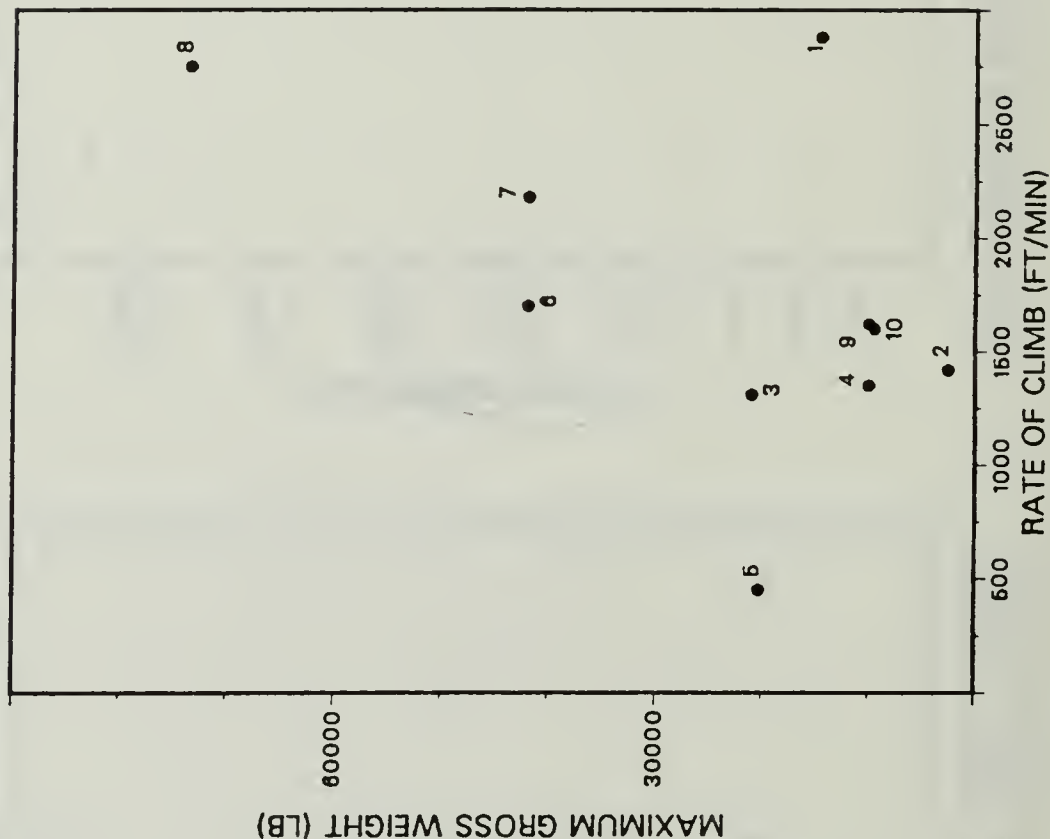


Fig. 23-30.

Fig. 23-30.

Hover Ceiling (IGE) Pairings.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

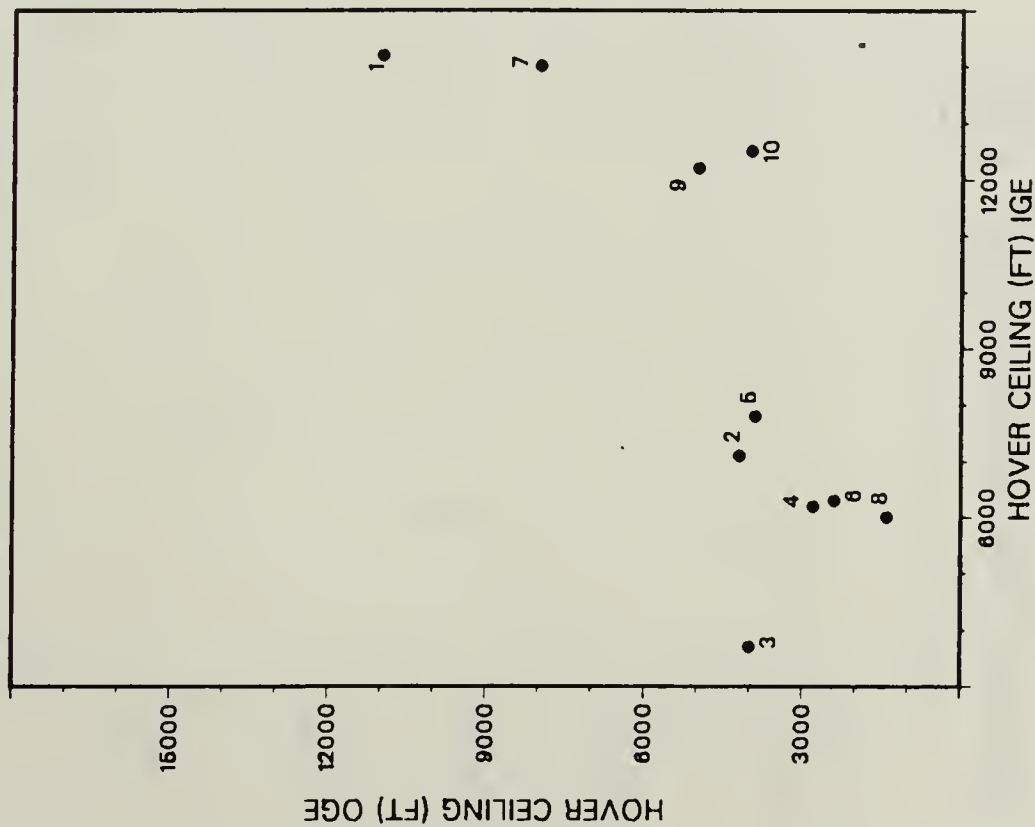


Fig. 24-25.

1. AH-84
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

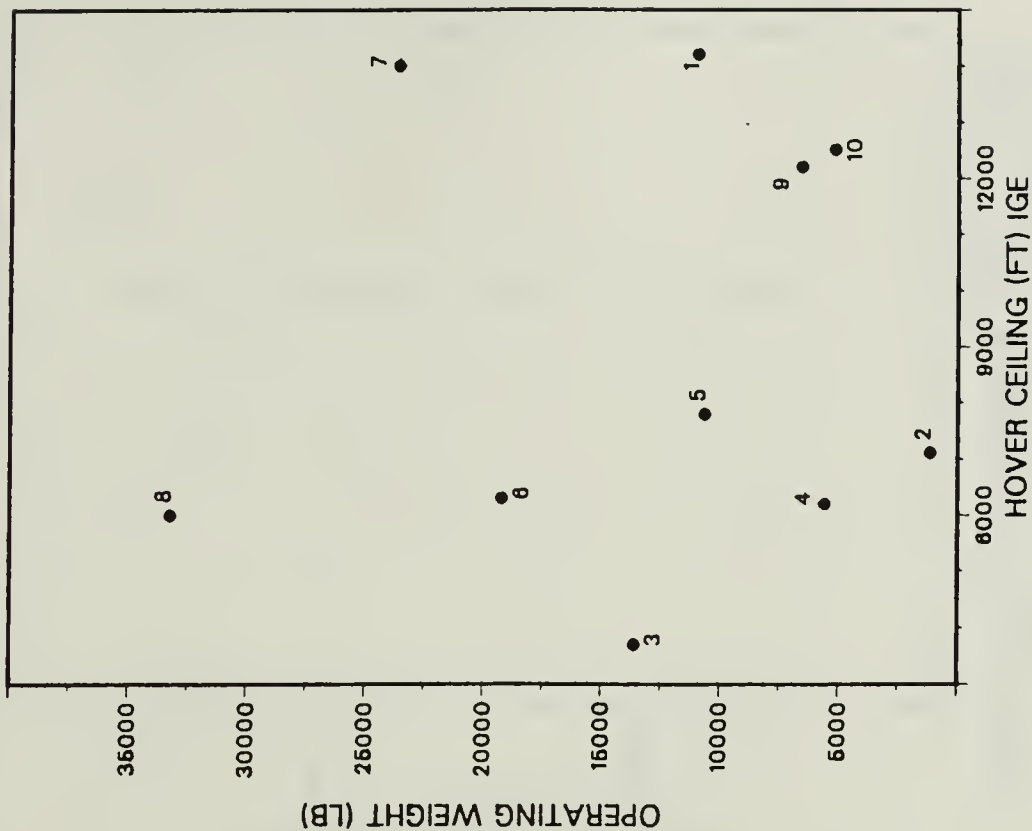


Fig. 24-27.

Fig. 24-25 and 24-27.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

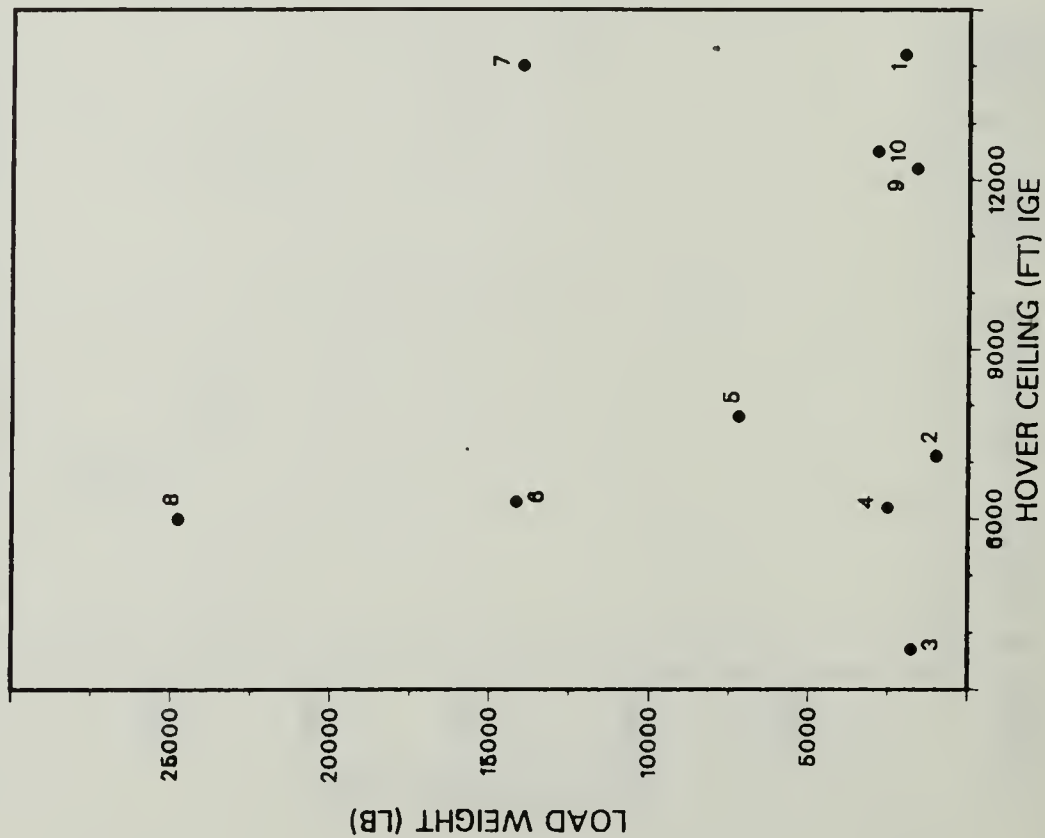


Fig. 24-28.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-63D
8. CH-63E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

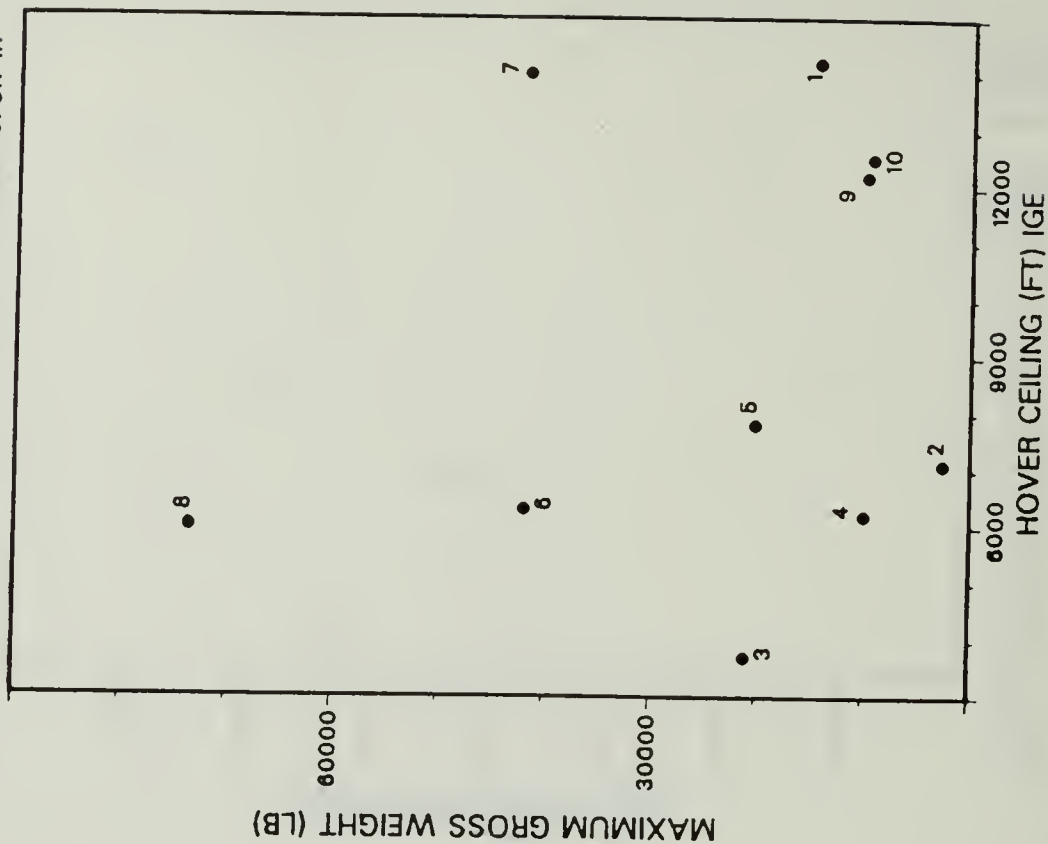


Fig. 24-30.

Fig. 24-28 and 24-30.

Hover Ceiling (OGE) Pairings.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

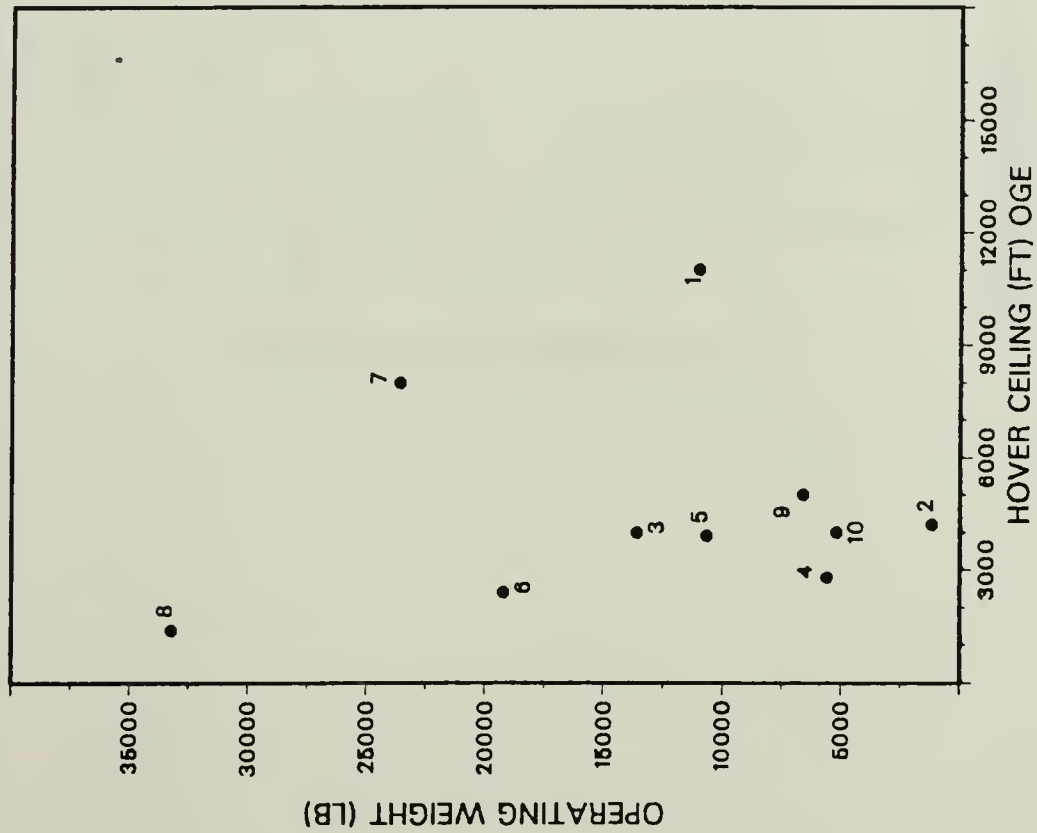


Fig. 25-27.

HELICOPTER DESIGN

- 1. AH-64
- 2. OH-68C
- 3. SH-3H
- 4. S-76
- 5. UH-60A
- 6. CH-54B
- 7. CH-53D
- 8. CH-53E
- 9. AH-1S
- 10. UH-1H

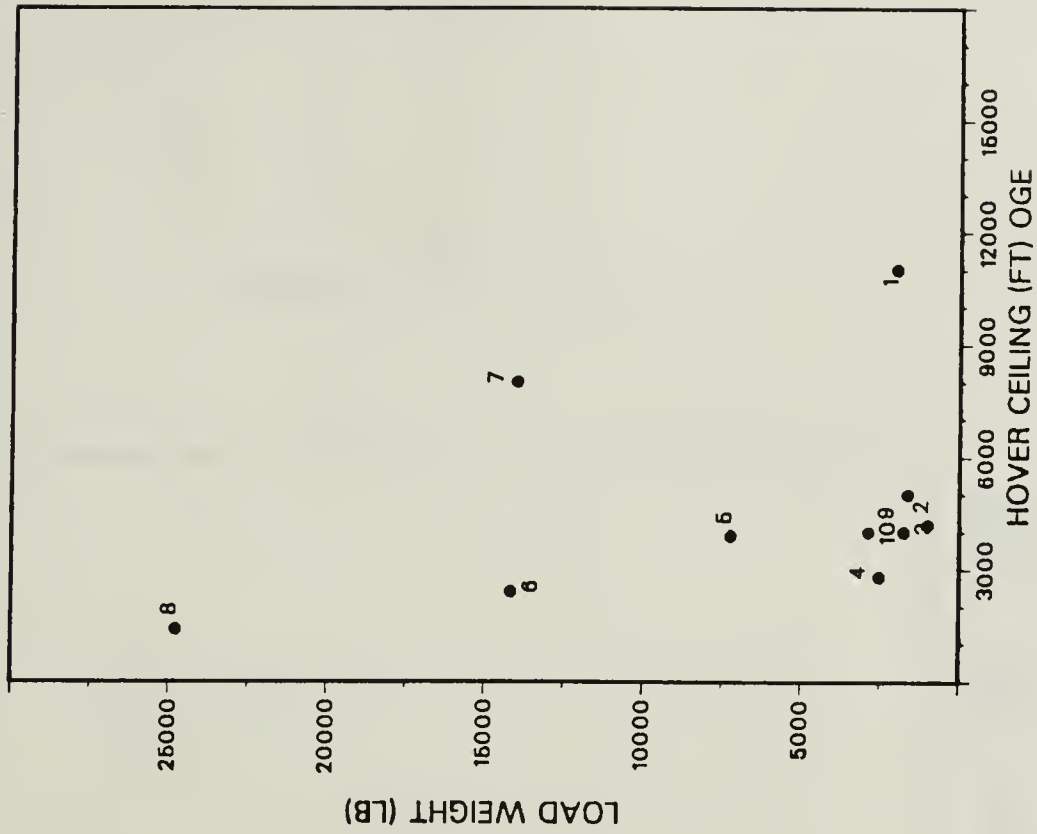


Fig. 25-28.

Fig. 25-27 and 25-28.

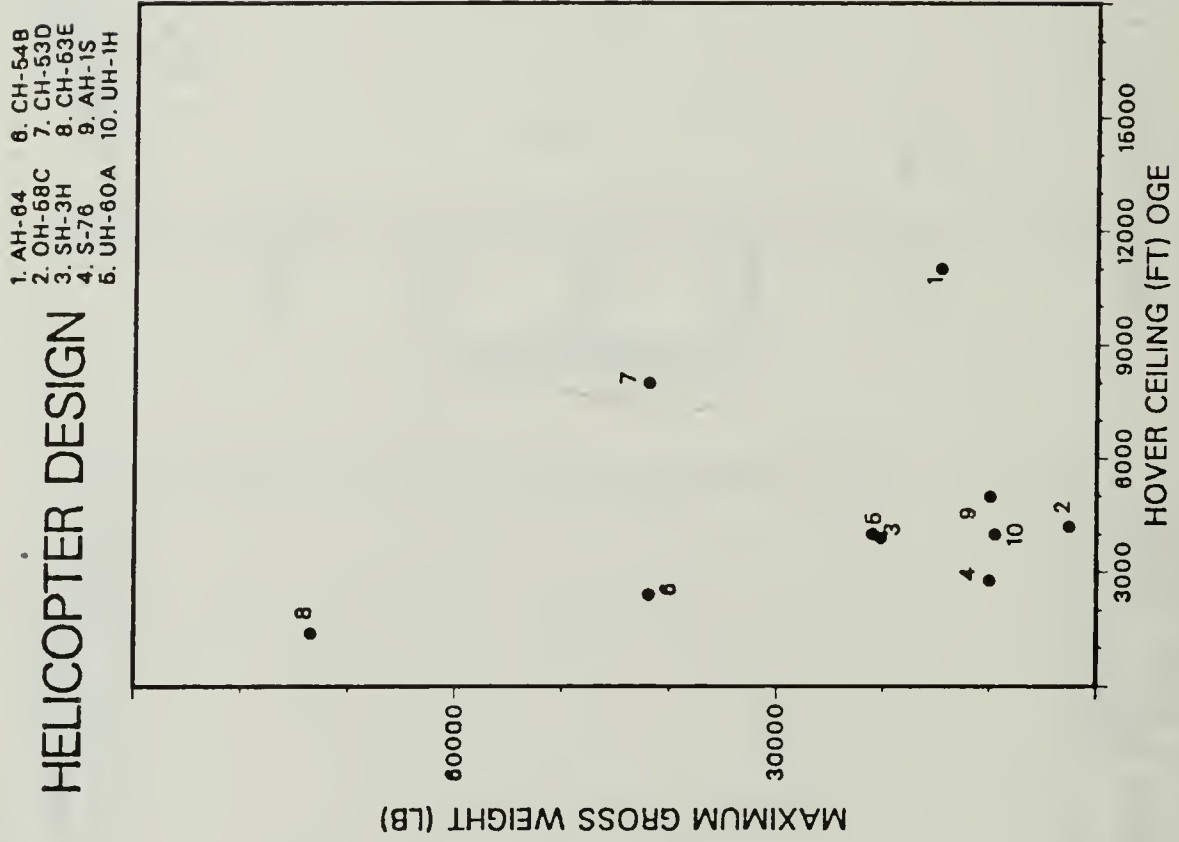


Fig. 25-30.

Fig. 25-30.

Length of Tail Pairings.

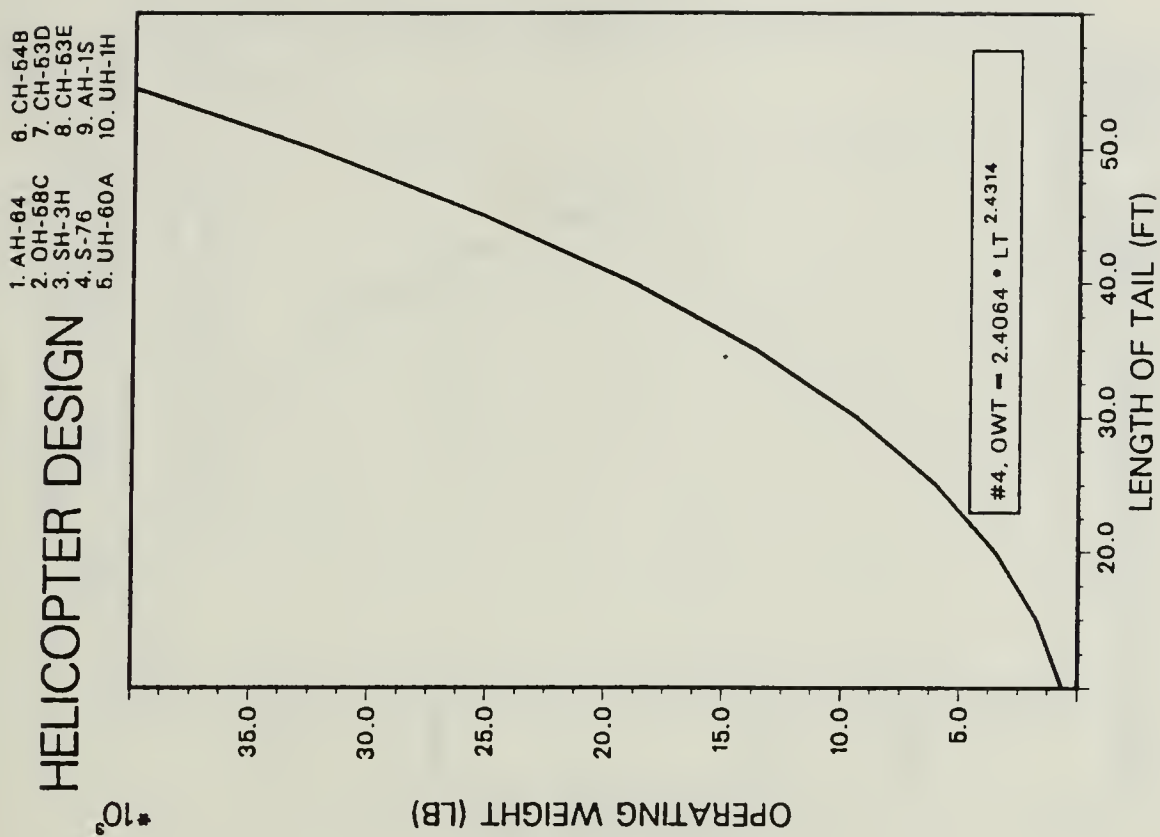


Fig. 26-27b.

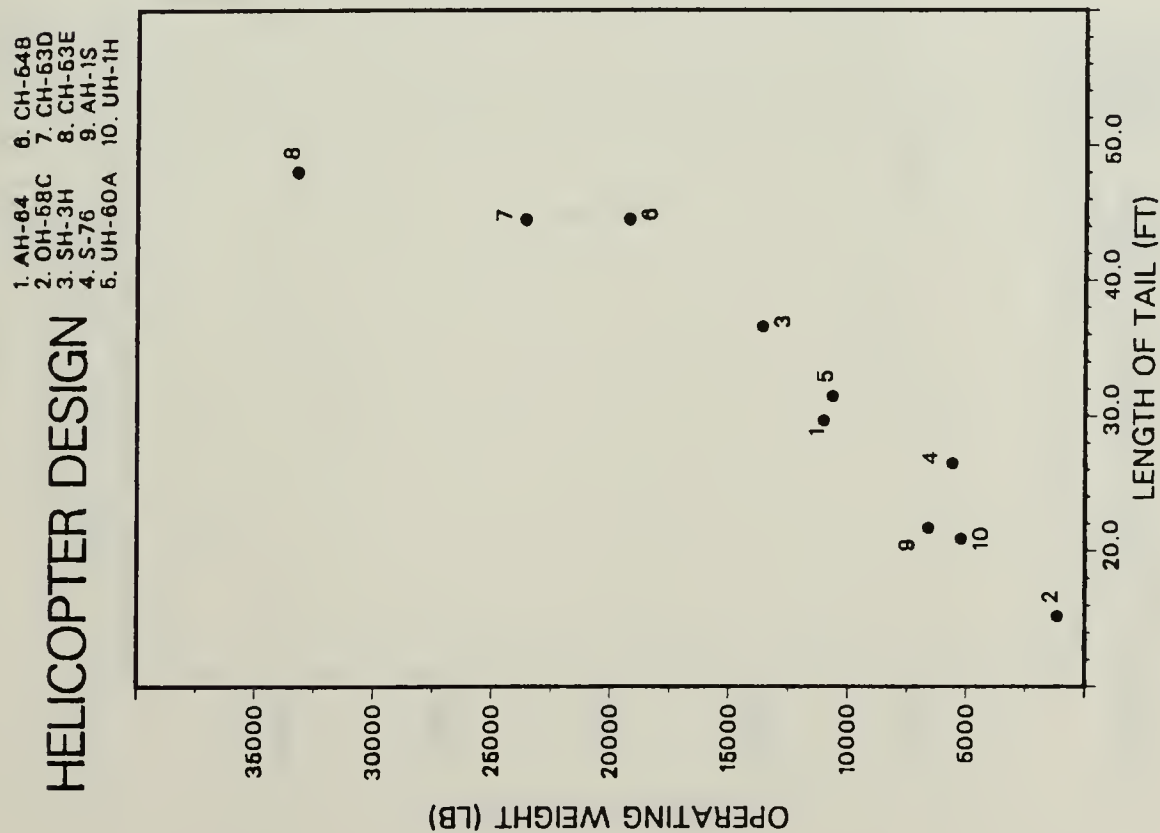


Fig. 26-27a.

Fig. 26-27a and 26-27b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

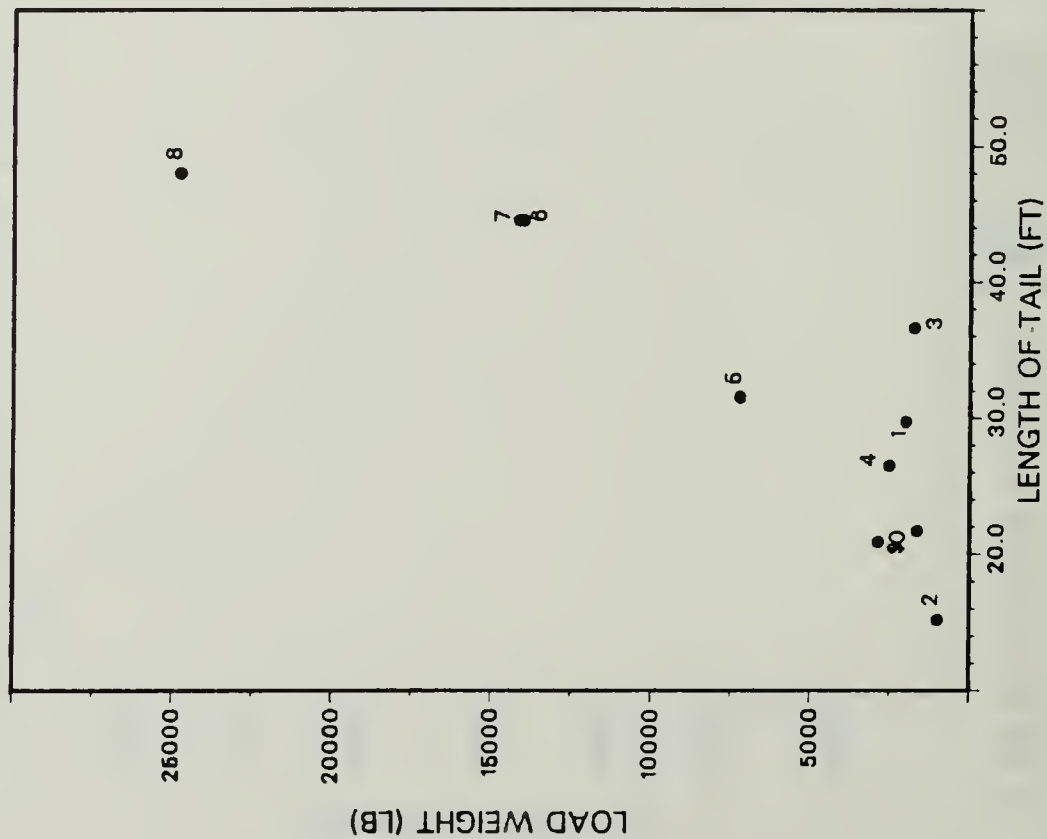


Fig. 26-28a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

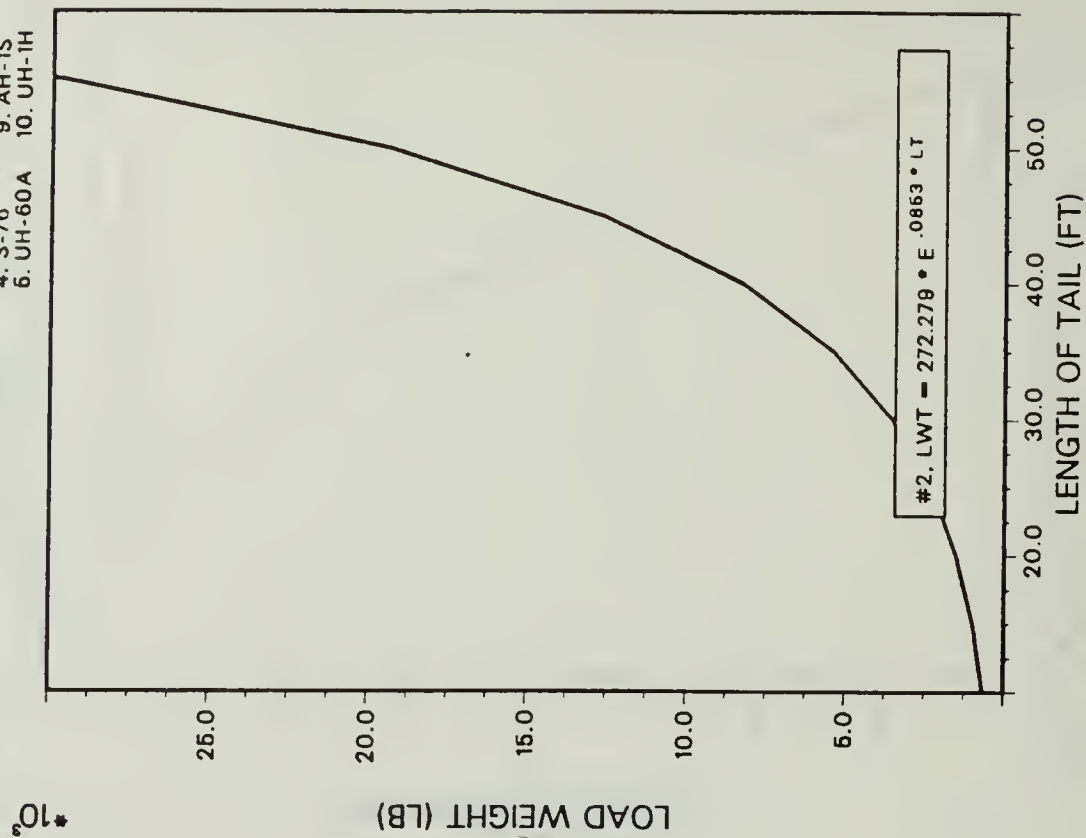


Fig. 26-28b.

Fig. 26-28a and 26-28b.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

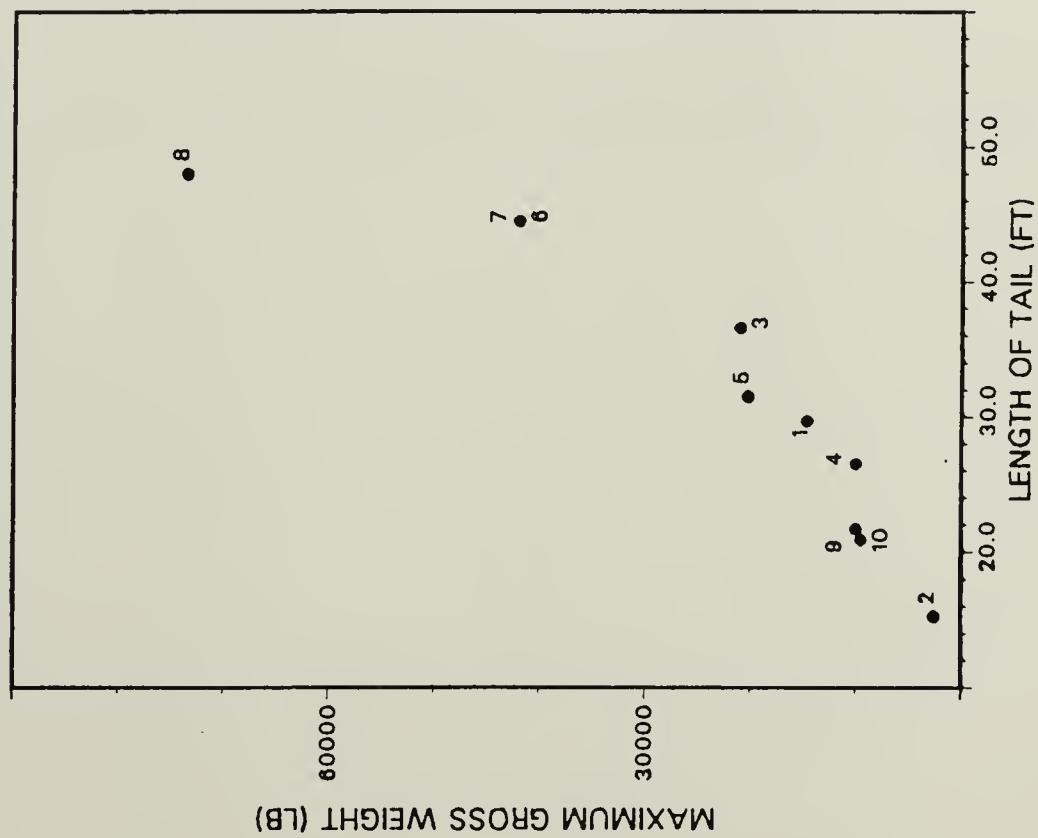


Fig. 26-30a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

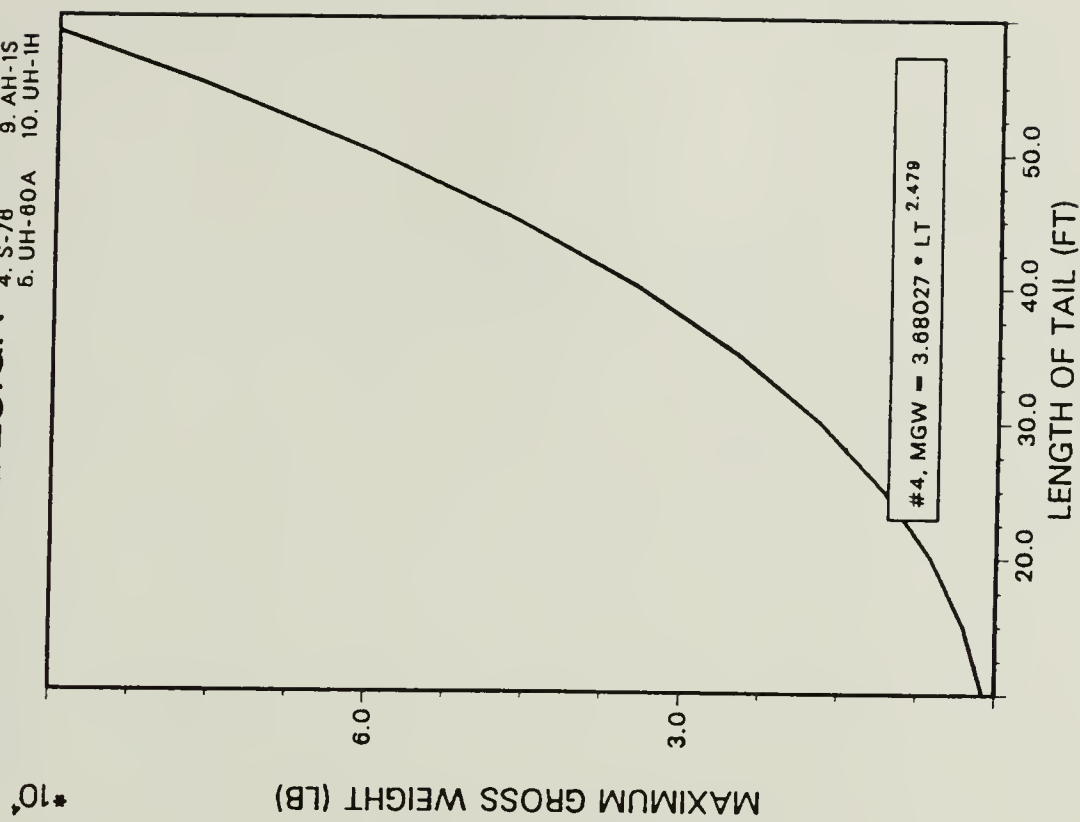


Fig. 26-30b.

Fig. 26-30a and 26-30b.

Operating Weight Pairings.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

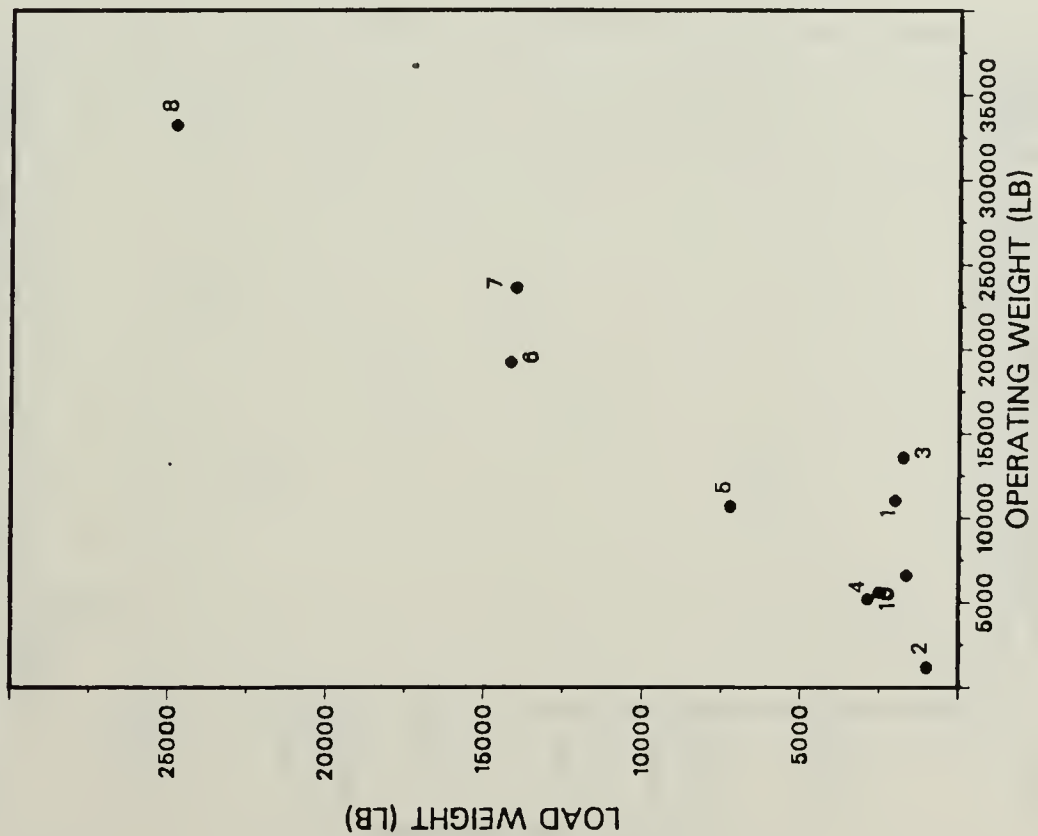


Fig. 27-28a.

1. AH-64
2. OH-58C
3. SH-3H
4. S-76
5. UH-60A
6. CH-54B
7. CH-53D
8. CH-53E
9. AH-1S
10. UH-1H

HELICOPTER DESIGN

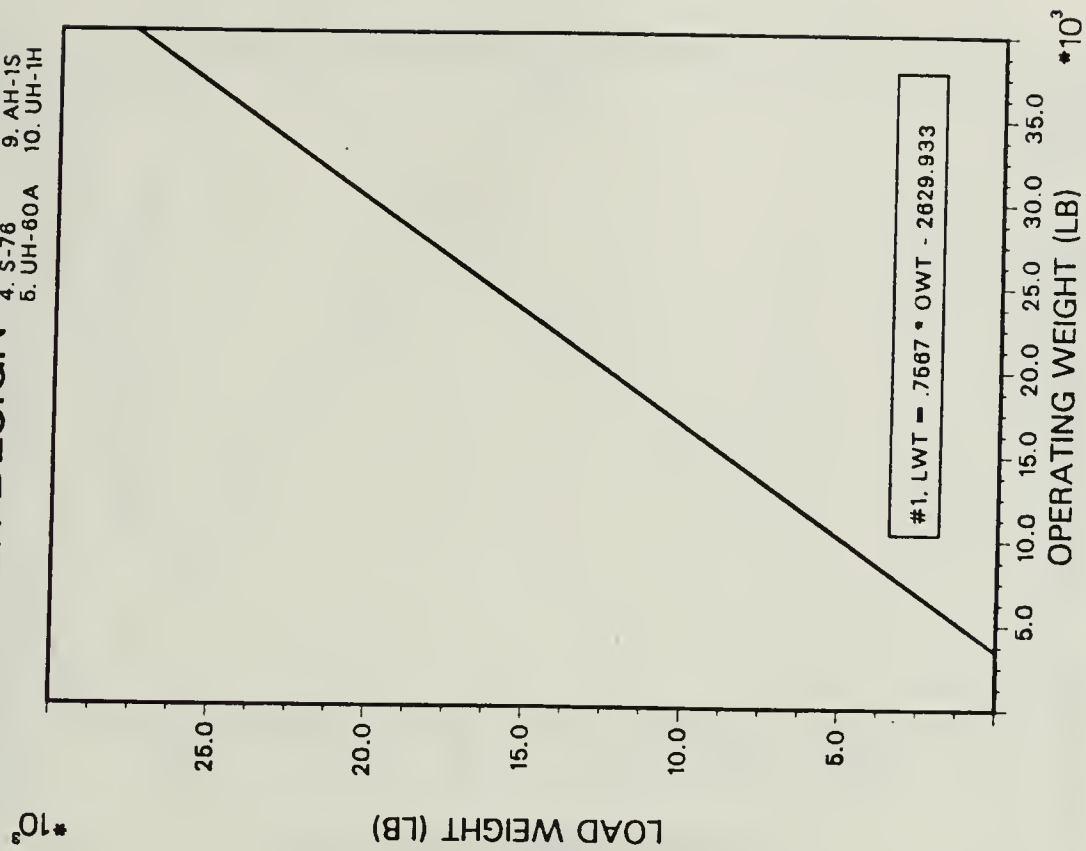


Fig. 27-28b.

Fig. 27-28a and 27-28b.

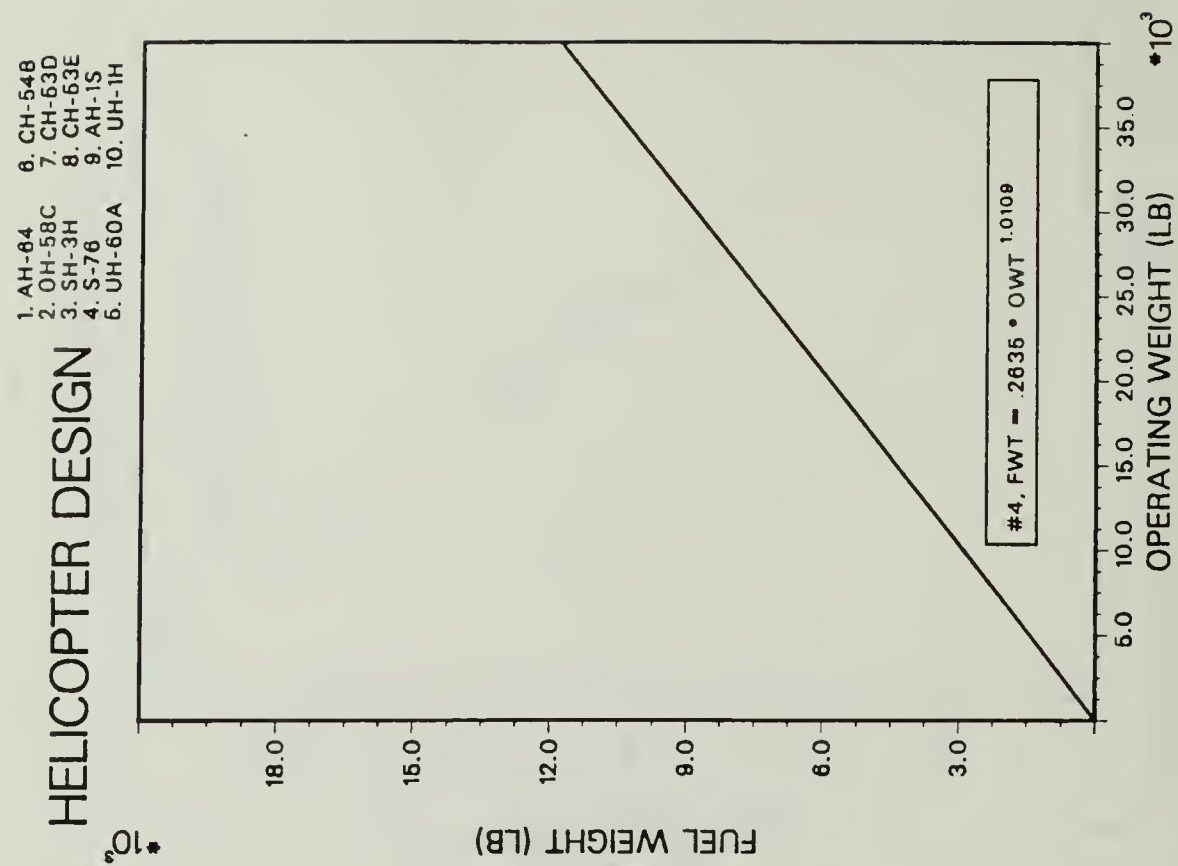


Fig. 27-29b.

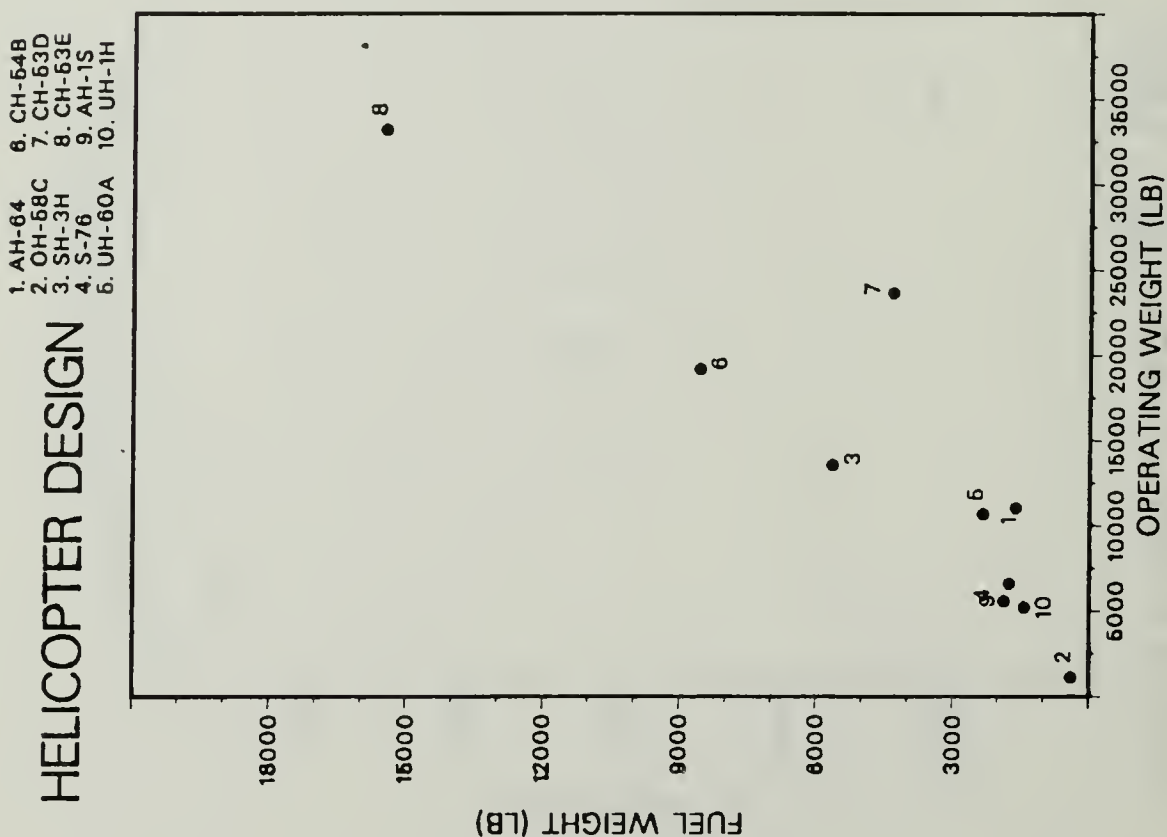


Fig. 27-29a.

Fig. 27-29a and 27-29b.

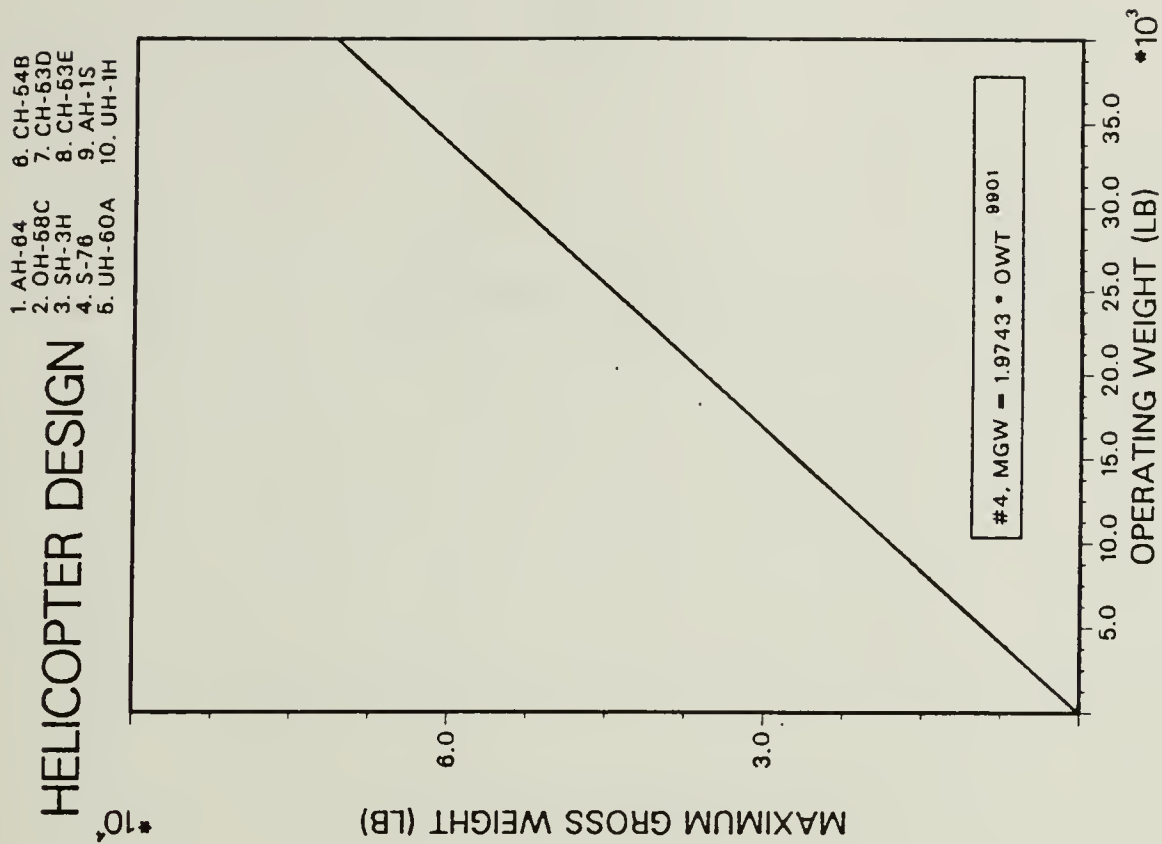


Fig. 27-30b.

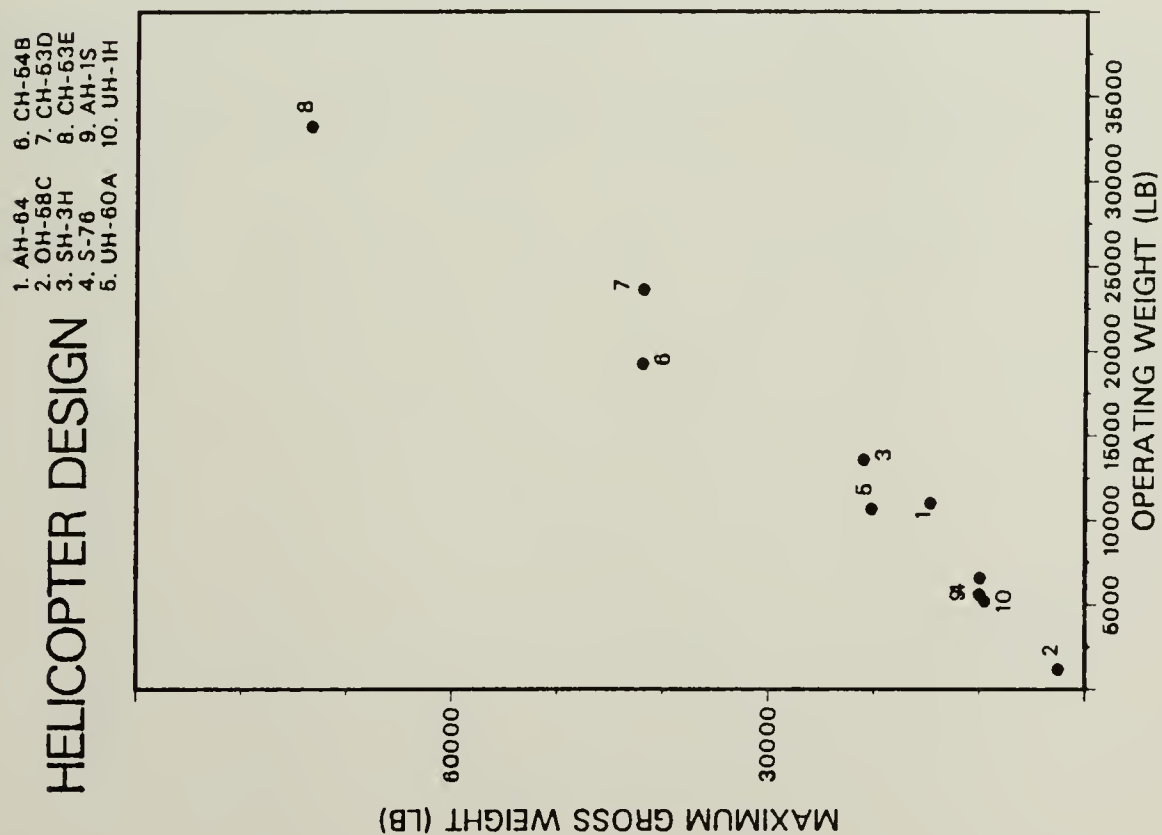


Fig. 27-30a.

Fig. 27-30a and 27-30b.

Load Weight Pairings.

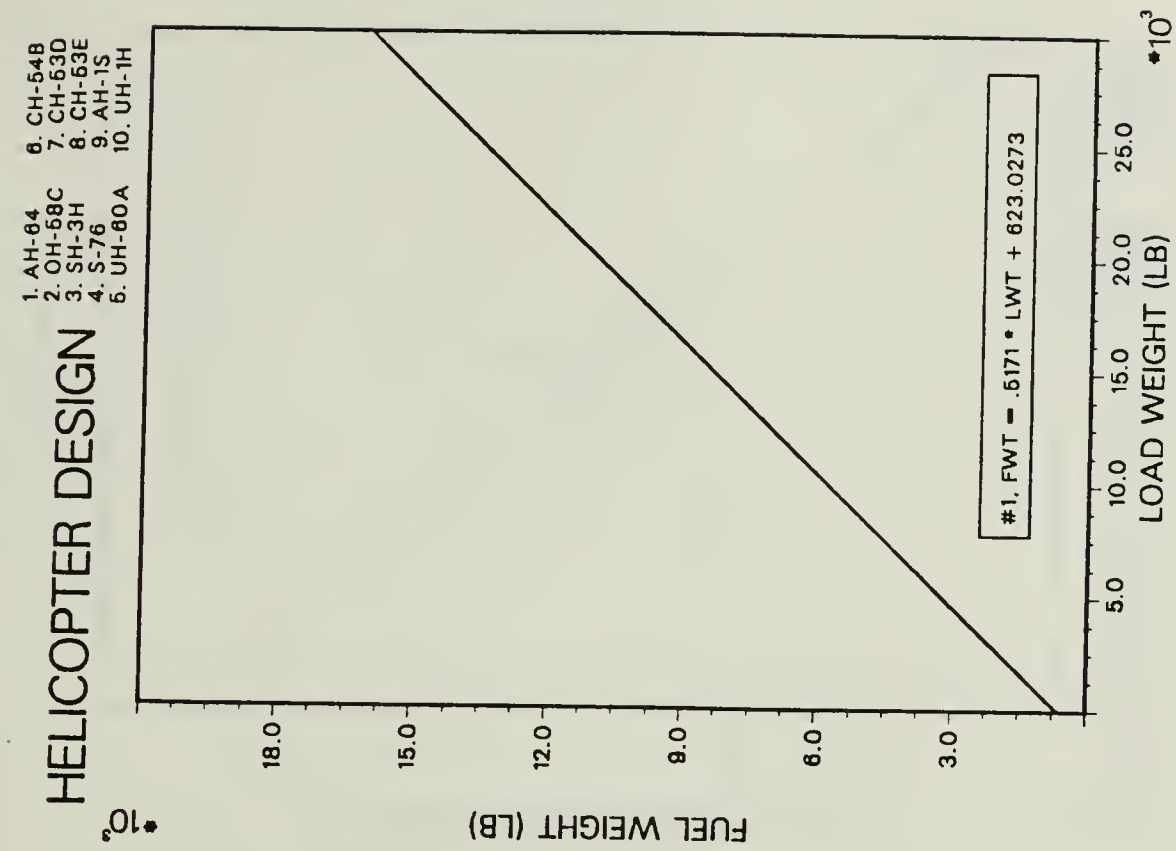


Fig. 28-29b.

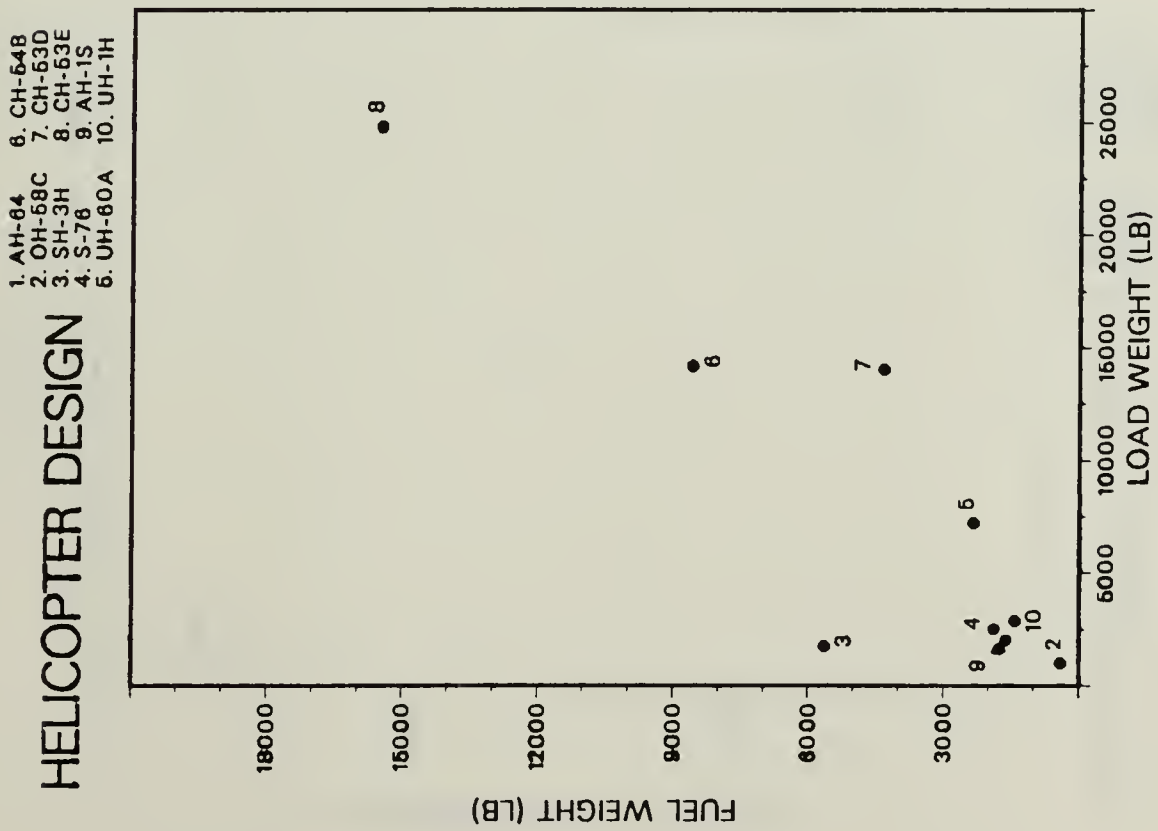


Fig. 28-29a.

Fig. 28-29a and 28-29b.

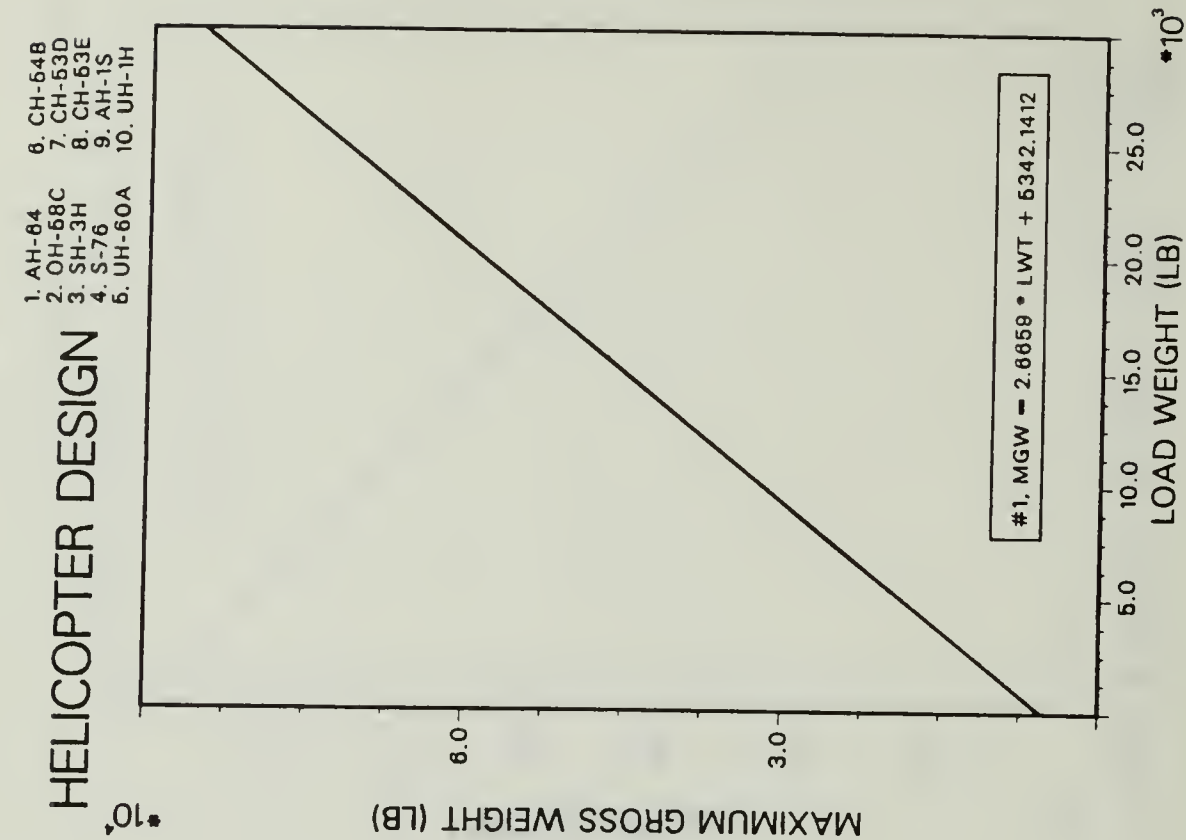


Fig. 28-30b.

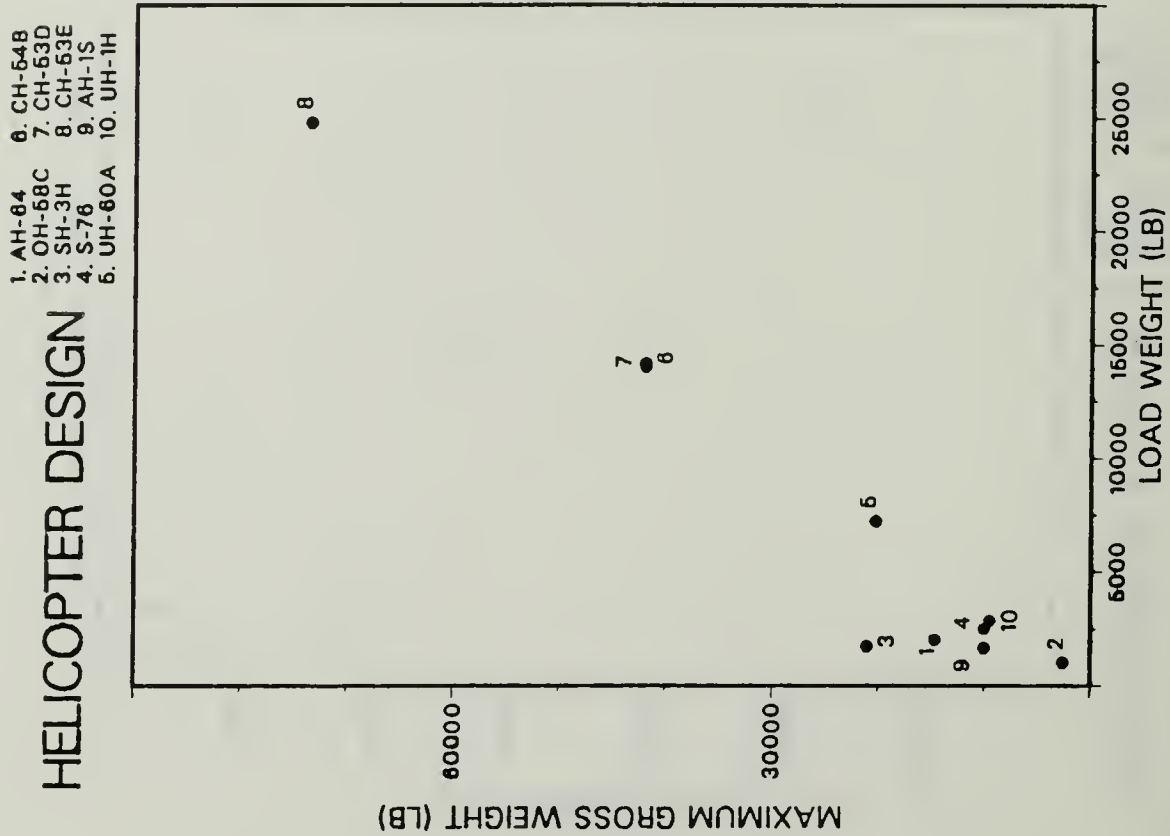


Fig. 28-30a.

Fig. 28-30a and 28-30b.

Fuel Weight Pairings.

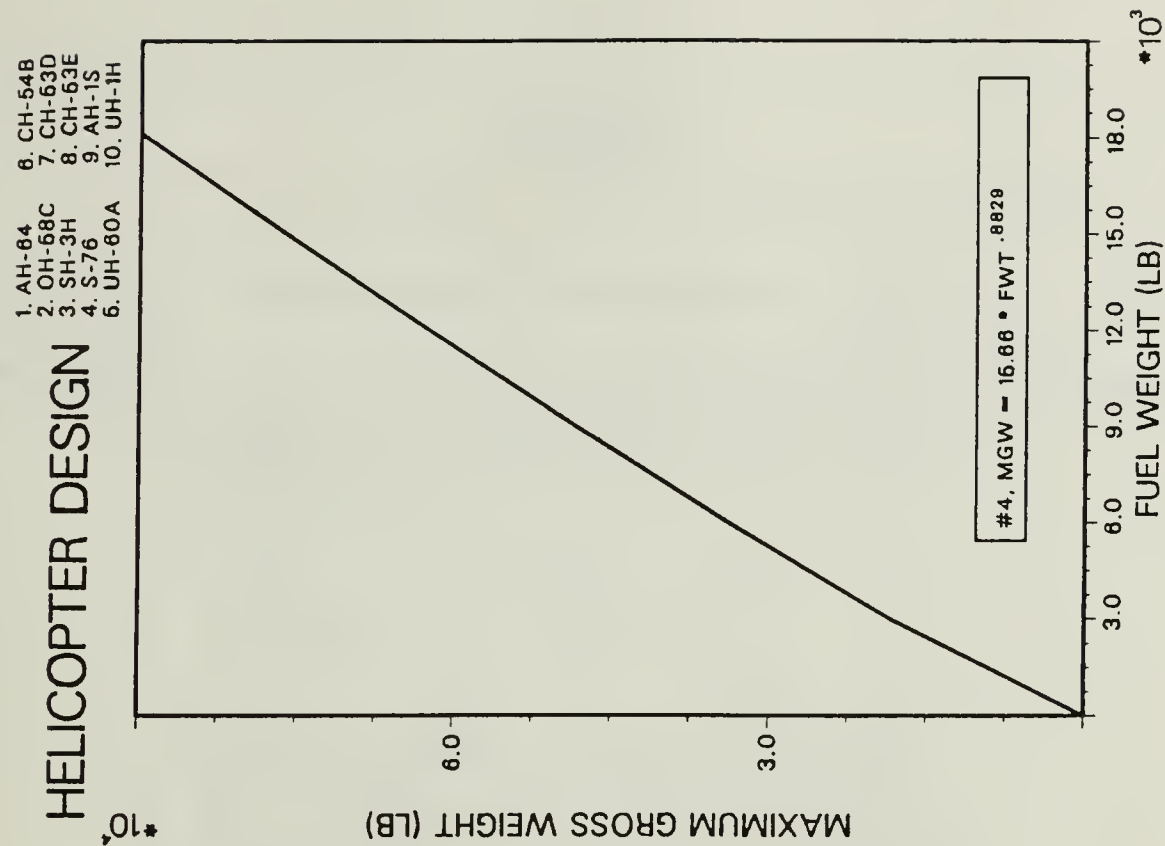


Fig. 29-30a.

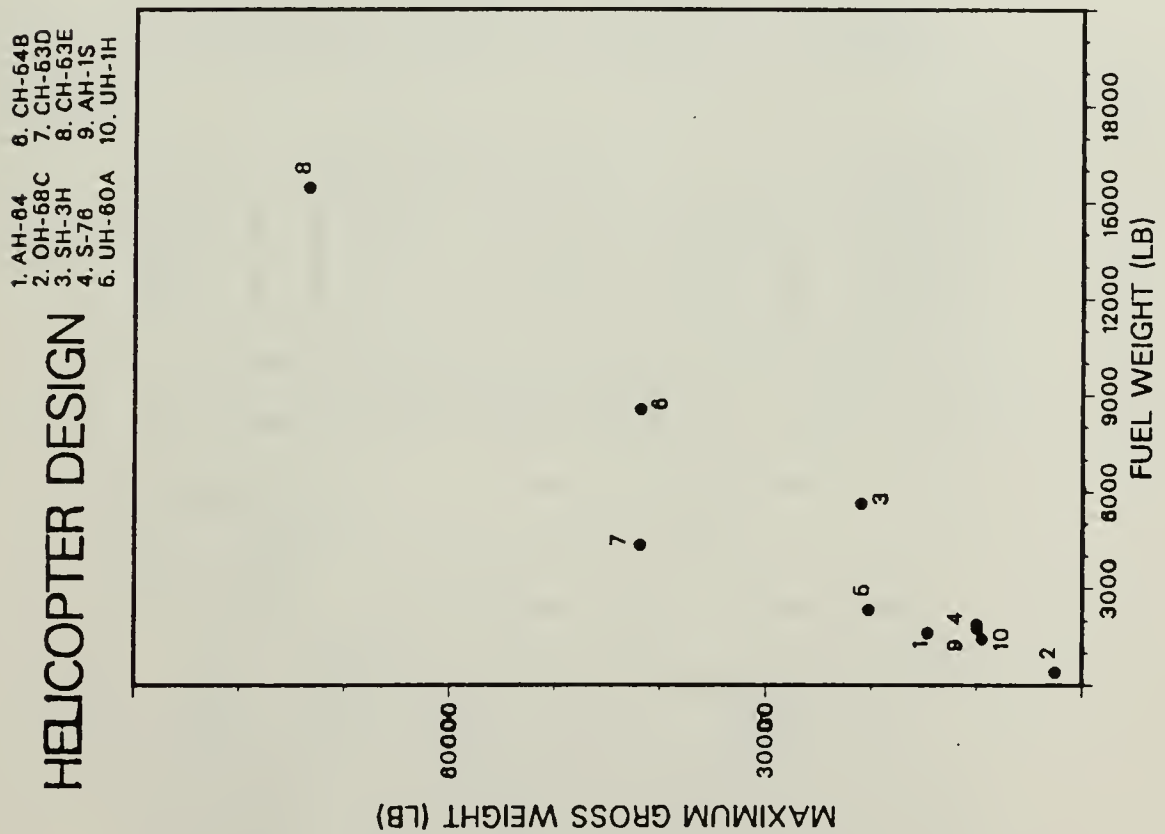


Fig. 29-30b.

Fig. 29-30a and 29-30b.



APPENDIX D

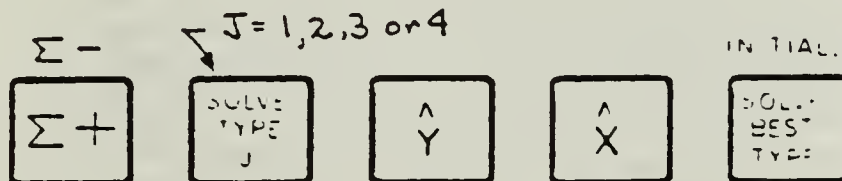
FORTRAN AND HEWLETT PACKARD COMPUTER PROGRAMS

A. 'CRVFIT' (DETERMINATION OF CURVE FIT EQUATIONS) HP PROGRAM

This program will determine a curve of best fit to a set of data points. The four standard curve types the program handles are:

1. Linear $y = b \cdot x + a$
2. Exponential $y = a \cdot e^{bx}$ ($a > 0$)
3. Logarithmic $y = b \cdot \ln(x) + a$
4. Power $y = a \cdot x^b$ ($a > 0$)

The program will compute the coefficients a and b in the equation of one of the above four curve types as well as compute a value r^2 called the coefficient of determination which is a measure of the goodness of fit. Once a set of data has been fit to a given curve type, a prediction may be made for the y -value given a new x -value, or a prediction may be made for the x -value given a new y -value. The functions available on the top row of keys on the keyboard are indicated in the following diagram.



These same functions are referenced in the examples and instructions by enclosing the name of the function on the key in square brackets [].

Example 1: Find the straight line which best fits the following data:

(1.1, 5.2), (4.5, 12.6), (8.0, 20.0),
(10.0, 23.0), (15.6, 34.0)

Then predict y when $x=20$ and predict x when $y=25$.

LOAD "CVF" PROG. Into the 41C and SIZE 027. GTO "CVF" and go into USER mode. This puts the program counter in ROM and makes the curve fit functions available on the top row of keys. Pressing [INITIALIZE] will initialize the program. This clears registers R11 thru R24 so that a new set of data may be entered. In this example the 5 data points will be entered using the [Σ+] key. Key in each pair as x ENTER y and push [Σ+].

<u>Do:</u>	<u>See:</u>
[INITIALIZE]	1.0000
1.1 ENTER↑ 5.2 [Σ+]	2.0000
4.5 ENTER↑ 12.6 [Σ+]	3.0000
8.0 ENTER↑ 20.0 [Σ+]	4.0000
10.0 ENTER↑ 23.0 [Σ+]	5.0000
15.6 ENTER↑ 34.0 [Σ+]	6.0000

All the data has now been entered and the parameters for the curve will be computed next. Since in this example we are interested in a straight line we key 1 (J=1) and push [SOLVE TYPE J]. When execution stops the values a, b, and r are available in the stack as:

Z: r	and are also stored as	R08: b
Y: a		R09: a
X: b		R10: r

For this example:

Z: r=0.999035140.
Y: a=3.499147270
X: b=1.972047542

The value r ranges between -1 and +1 and is a measure of how well the data fits the given curve type. The sign of r indicates whether the data is positively or negatively skewed. The closer r is to one of the extremes ± 1 the better the fit. For this example the line has positive slope and the fit is extremely good (all sample problems seem to work well).

Having computed the values b and a (these remain stored in R08 & R09 until new data is input) we can determine new points along the line. Key in 20 and push [\hat{y}] for the predicted y-value. $y=42.94009811$ when $x=20$. Key in 25 and push [\hat{x}] for the predicted x-value. $x=10.90280649$ when $y=25$.

COMPLETE INSTRUCTIONS FOR "CVF"

(Keyboard Operation)

- 1) Key GTO " ", SIZE 027 and go into USER mode. The keyboard functions should now be now available on the top row of keys.
- 2) Press [INITIALIZE] to initialize the program. This step clears data registers R11 thru R24 inclusive. These registers will be used to accumulate the data for all four curve types. The display will show 1.

3) Key in the next data pair (x,y) as x ENTER y and push [$\Sigma +$]. Repeat this step for all data pairs. The display will stop with a count of the number of the next data pair to be entered. This feature makes it possible to enter only the y-values when the x-values are consecutive integers which start counting from 1. In this case the display provides the x-values which need not be entered. If an improper data pair has just been input with the [$\Sigma +$] key, then immediately pressing R/S will delete the pair. Otherwise an improper or undesired data pair can be deleted by re-entering both x and y and pressing [$\Sigma -$].

4) As data pairs are entered it is possible that some x or y value is negative or zero. In these cases only one or two of the four curve types may be applied to the data. The four curve types and their respective equations are as follows:

Type J	Name	Equation
1	Linear	$y = b \cdot x + a$
2	Exponential	$y = a \cdot e^{bx} \quad (a > 0)$
3	Logarithmic	$y = b \cdot \ln(x) + a$
4	Power -	$y = a \cdot x^b \quad (a > 0)$

If any x-values are negative or zero then only types 1 & 2 are feasible curves. If any y-values are negative or zero then only types 1 & 3 are feasible curves. If in any data pair both x and y are negative or zero then type 1 is the only feasible curve. The a coefficient must be positive for curve types 2 and 4.

5) After all data pairs have been input the next step is to select the desired curve type. This step can be accomplished in one of two ways. Under either option, the 41C should not be interrupted or else there is a possibility that the data registers will not be returned with their normal contents.

a) To fit a particular curve type, key in the number 1-4 for that type and press [SOLVE TYPE J]. The stack returns with:

Z: r	and these parameters	R07: J=curve type
Y: a	remain stored in	R08: b
X: b		R09: a
		R10: r

Step a) may be repeated at any time for any of the four curve types.

b) If all data input is positive then pressing [SOLVE BEST] will automatically choose the curve of best fit according to the curve type with largest absolute value of r . In this case the stack returns with:

T: r	and these parameters	R07: J=curve type
Z: a	remain stored in	R08: b
Y: b		R09: a
X: J=best curve type		R10: r

6) Predictions for new x or y values may be made only after step 5) has been completed. Predictions for new values are based on the settings of flags F08 and F09 which are automatically set during the fit process in step 5). The status of flags 8 and 9 for the four curve types are as follows.

	<u>Flag 8</u>	<u>Flag 9</u>
1 Linear	clear	clear
2 Exponential	set	clear
3 Logarithmic	clear	set
4 Power	set	set

In general the user need not be concerned with these flag settings, and F08 and F09 are not available for other use and must not be disturbed. To predict y given x , key in x and press [\hat{y}]. To predict x given y , key in y and press [\hat{x}]. In both cases the predicted value is left in the X-register.

7) New data may be added or deleted at any time via the [$\Sigma+$] or [$\Sigma-$] keys. However, step 5) must be performed after updating the data before any new predictions can be made using step 6). The parameters a and b are automatically destroyed after input of new data.

01*LBL "CVF"
 02 XEQ e
 03 GTO IND 06
 04*LBL A
 05*LBL 01
 06 CF 10
 07*LBL 06
 08 STO 09
 09 X<>Y
 10 STO 08
 11 ΣREG 13
 12 FC? 10
 13 Σ+
 14 FS? 10
 15 Σ-
 16 RDN
 17 RCL 08
 18 ENTER↑
 19 X>0?
 20 LN
 21 ST* Z
 22 RCL 09
 23 X>0?
 24 LN
 25 ST* Z
 26 X<>Y
 27 ΣREG 19
 28 FC? 10
 29 Σ+
 30 FS? 10
 31 Σ-
 32 R↑
 33 FS? 10
 34 CHS
 35 ST+ 12
 36 R↑
 37 FS? 10
 38 CHS
 39 ST+ 11
 40 X<> Z
 41 SIGN
 42 ST+ L
 43 RCL 08
 44 RCL 09
 45 X<> L
 46 RTN
 47 RCL 08
 48 RCL 09
 49*LBL a
 50 SF 10

51 GTO 06
 52*LBL B
 53*LBL 02
 54 CF 08
 55 CF 09
 56 STO 07
 57 2
 58 X<Y?
 59 SF 09
 60 /
 61 FRC
 62 X=0?
 63 SF 08
 64 8
 65 ST+ 07
 66 XEQ IND 07
 67 RCL 17
 68 RCL 13
 69 RCL 15
 70 STO 09
 71 *
 72 RCL 18
 73 /
 74 -
 75 STO 10
 76 RCL 14
 77 RCL 13
 78 X↑2
 79 RCL 18
 80 /
 81 -
 82 STO Z
 83 /
 84 STO 08
 85 RCL 13
 86 *
 87 ST- 09
 88 X<>Y
 89 RCL 16
 90 RCL 15
 91 X↑2
 92 RCL 18
 93 ST/ 09
 94 /
 95 -
 96 *
 97 SQRT
 98 ST/ 10
 99 XEQ IND 07
 100 8

101 ST- 07
 102 RCL 10
 103 RCL 09
 104 FS? 08
 105 E↑X
 106 STO 09
 107 RCL 08
 108 RTN
 109*LBL 10
 110 RCL 11
 111 X<> 17
 112 STO 11
 113*LBL 13
 114 RCL 21
 115 X<> 15
 116 STO 21
 117 RCL 22
 118 X<> 16
 119 STO 22
 120*LBL 09
 121 RTN
 122*LBL 11
 123 RCL 12
 124 X<> 17
 125 STO 12
 126*LBL 14
 127 RCL 19
 128 X<> 13
 129 STO 19
 130 RCL 20
 131 X<> 14
 132 STO 20
 133 RTN
 134*LBL 12
 135 RCL 23
 136 X<> 17
 137 STO 23
 138 XEQ 14
 139 GTO 13
 140*LBL C
 141*LBL 03
 142 FS? 09
 143 LN
 144 RCL 08
 145 *
 146 RCL 09
 147 FS? 08
 148 LN
 149 +
 150 FS? 08

151 E↑X
 152 RTN
 153*LBL D
 154*LBL 04
 155 FS? 08
 156 LN
 157 RCL 09
 158 FS? 08
 159 LN
 160 -
 161 RCL 08
 162 /
 163 FS? 09
 164 E↑X
 165 RTN
 166*LBL e
 167*LBL 00
 168 CLRGR
 169 SF 27
 170 E
 171 RTN
 172*LBL E
 173*LBL 05
 174 .
 175 STO 25
 176 4
 177 STO 07
 178*LBL 07
 179 RCL 07
 180 XEQ B
 181 RCL 25
 182 RCL 10
 183 ABS
 184 X<=Y?
 185 GTO 15
 186 STO 25
 187 RCL 07
 188 STO 26
 189*LBL 15
 190 DSE 07
 191 GTO 07
 192 RCL 26
 193 XEQ 02
 194 RCL 26
 195 .END.

B. 'CRVFIT' (GRAPHING OF CURVE FITS) FORTRAN PROGRAM

```

PRCCGFAM TO GENERATE DATA PCINTS AND PRODUCE
GRAPHFS REPRESENTING CURVE-FITTED DATA

INTEGER I, KINDS(200), J, R
REAL X(17), Y(17)
CALL TEK618
CALL CCMPCS
LC 900 J=1, 16
R=FLUAT(J)
CALL FASCAL('SCREEN')
CALL SWISSI
CALL SETCLF('BLACK')
CALL HEIGHT(.1)

      APPLY HEADINGS AND UPPER LEGEND

CALL LINES('1. AH-64          6. CH-54B$', KINDS, 1)
CALL LINES('2. OH-58C        7. CH-53D$', KINDS, 2)
CALL LINES('3. SH-3F         8. CH-53E$', KINDS, 3)
CALL LINES('4. S-76          9. AH-1H$', KINDS, 4)
CALL RESET('HEIGHT')
CALL HEIGHT(.25)
CALL SHDCHF(SC, 1, C.C02, 1)
CALL PAGE(8.5, 11.)
CALL PFYSCF(2.45, 2.25)
CALL HAROT('ALTO')
CALL GFACE(C.C)
CALL NCCHEC
CALL AREAZC(4.65, 6.5)
CALL MESSAG('HELICOPTER DESIGN$', -100, -.7, 6.85)
CALL LSTORY(KINDS, 5, 2.75, 6.65)
CALL FFAME
CALL XAXENC('NCNENCS')
CALL YAXENC('NCNENCS')
CALL RESET('HEIGHT')
CALL HEIGHT(.15)

      APPLY AXIS LABELS

GC TO (11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26),
CALL YNAME('TAIL RCI(R RADIUS (FT))$', 100)

```



```

24      GC TO 200
      Y(1)=283577.28 X(1) (-1.650)
25      GC TO 200
      Y(1)=.210*(X(1))*+.647
26      GC TC 200
      Y(1)=.037*(X(1))- .165
27      GC TO 200
      Y(1)=17.370 ALG(X(1))-33.177
28      GC TC 200
      Y(1)=1.015*(EXP(.052*(X(1))))
29      GC TO 200
      Y(1)=2.3938*(EXP(.042*(X(1))))
40      GC TO 200
      Y(1)=.501*(X(1))*+1.402
41      GC TO 200
      Y(1)=2.396*(X(1))-32.158
42      GC TO 200
      Y(1)=1.533*(X(1))-10.740
43      GC TO 200
      Y(1)=1298.244*(X(1))-23135.238
44      GC TO 200
      Y(1)=51.795*(EXP(.127*(X(1))))
45      GC TO 200
      Y(1)=.0094*(X(1))*+3.816
46      GC TO 200
      Y(1)=.1132*(X(1))*+3.615
200      CONTINUE
      LC 731 I=1,16
      X(I+1)=X(I)+2.C
      GC TO 27,28,29,30,47,48,49,50,67,68,69,70,87,88,89,90,91,R
27      Y(I+1)=(.(360)*X(I+1))*+(1.512)
      GC TC 300
28      Y(I+1)=.232*(X(I+1)) - 2.309
      GC TC 200
29      Y(I+1)=651.251*(EXP(-.036*(X(I+1))))
      GC TO 300
30      Y(I+1)=283577.28*(X(I+1)) - (-1.650)
      GC TO 300
47      Y(I+1)=.210*(X(I+1))*+.647
      GC TC 300
48      Y(I+1)=.037*(X(I+1))- .165
      GC TC 200
49      Y(I+1)=17.370 ALG(X(I+1))-33.177
      GC TO 300
50      Y(I+1)=1.015*(EXP(.052*(X(I+1))))
      GC TC 200
67      Y(I+1)=2.3938*(EXP(.042*(X(I+1))))

```

```

68      Y(I+1)=.5C1*(X(I+1))*.402
69      Y(I+1)=2.356*(X(I+1))-22.198
70      Y(I+1)=1.533*(X(I+1))-10.740
87      Y(I+1)=1298.244*(X(I+1))-23135.238
88      Y(I+1)=91.755*(EXP(.137*X(I+1)))
89      Y(I+1)=.054*(X(I+1))*2.816
90      Y(I+1)=.1132*(X(I+1))*3.615
91      CONTINUE
92      GO TO 400
93      CALL GRAF(15.,50.45.,0.0,1.0,9.0)
94      CALL GRAF(15.,5.,45.,0.100.,600.)
95      CALL GRAF(15.,5.0,45.,500.,3500.)
96      CALL GRAF(15.,5.0,45.,0.0,1.5)
97      CALL GRAF(15.,5.0,45.,10.,5.0,40.)
98      CALL GRAF(15.,5.0,45.,0.0,1.0,10.)
99      CALL GRAF(15.,5.0,45.,3.0,1.0,16.)
60      CALL GRAF(15.,5.0,45.,20.,120.)
61      CALL GRAF(15.,5.0,45.,0.0,10.,70.)
62      CALL GRAF(15.,5.0,45.,10.,10.,60.)
63      CALL GRAF(15.,5.0,45.,0.0,5000.,40000.)
64      CALL GRAF(15.,5.0,45.,0.0,5000.,20000.)
65      CALL GRAF(15.,5.0,45.,0.0,3000.,21000.)

```



```

$CC
C
C
C
C
C
GL TO 500
CONTINUE
CALL RESET('MIXALF')
CALL BLREC(1.4,0.4,3.C,.35,.015)
* 1.4 0.4 3.0 0.35 0.015
* 1.4 0.4 3.0 0.35 0.015
* 1.4 0.4 3.0 0.35 0.015
CALL THKCRV(.02)
CALL CURVE(,Y,16,C)
CALL RESET('THKCRV')
CALL ENDPL(C)
CONTINUE
CALL DCNEPL
STOP
END
$CC

```

LIST OF REFERENCES

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2. Sullivan, Patrick, Commander, USN, Hewett Packard Hand Held Computer Program for Determining Curve Fits and Curve Fit Equations, written for use in classes at the Naval Postgraduate School, Monterey, California, February, 1982.
3. Layton, Professor Donald M., AE 4306 Helicopter Design Manual, Naval Postgraduate School, Monterey, California, 1983.

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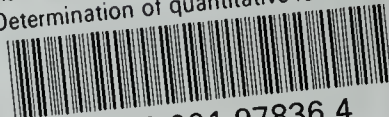
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